



(RESEARCH ARTICLE)



Payments Infrastructure: Instant Payments (Fed Now and RTP), Fedwire ISO20022, ACH, and Credit Unions

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World Journal of Advanced Engineering Technology and Sciences, 2025, 16(02), 353-363

Publication history: Received on 16 July 2025; revised on 24 August 2025; accepted on 26 August 2025

Article DOI: <https://doi.org/10.30574/wjaets.2025.16.2.1309>

Abstract

The article examines the evolving U.S. payment systems market, focusing on rapid payment technologies such as FedNow, Real-Time Payments (RTP), Automated Clearing House (ACH), and the adoption of fedwire iso20022 standards. The paper shall expound on the challenges and the opportunities that the innovations bring, particularly for small financial bodies like the Credit Unions. We examine with the help of complex studies how such bank structures as Bank of America and Coastal Credit Union have effectively implemented FedNow and RTP to achieve faster, safer, and more satisfactory payments. The article also goes into the importance of fedwire iso20022 in enhancing interoperability and data management between systems. The discussion of the paper assesses the significance of current payment structures through their significance in the financial commercial activity, especially regarding their potential to sustain continuity and conform to consumer demands for convenient, quick, and secure payments in business and financing operations. Lastly, the paper provides a hint of the direction that payment systems are moving and the effects that they can have as far as the economy is concerned.

Keywords: Payment Systems; Transaction Speed; User Satisfaction; ACH Processing; Real-Time Payments; Financial Inclusion

1. Introduction

Historical advancements in payment systems have catalyzed the development of current payment systems, driven by the increasing demand for speed, security, and convenience in transactions. Over the years, traditional payment methods like checks and wire transfers have gradually given way to more advanced systems, such as Automated Clearing House (ACH), which has long been a staple for batch processing. With the full onset of real-time payments like FedNow and Real-Time Payments (RTP), there's a major changeover in the digital economy, providing consumers and businesses with faster and seamless transactions (Cooper, Labonte, and Perkins, 2019). These advancements have transformed the financial environment, offering near-instant payment modes that speed up the pace of transactions and minimize delays commonly associated with ACH.

Fedwire iso20022 has also made further improvements in the payment infrastructure, giving standardity in the speech among the systems, therefore improving interoperability and data transfer across global networks (Crawford, Menand, and Ricks, 2021). This standard messaging allows the seamless inter-activation of the new technology with the existing systems, and this provides an enhanced, more integrated payment system.

The financial institutions that are often smaller, such as Credit Unions, have particular challenges in adopting these technologies since they have limited resources. Nonetheless, such institutions will also gain enormously from the enhanced payment systems, as those will be able to provide the members with speedier transactions and broader access

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to novel financial services. In that way, the effective introduction of such types of instant payment systems as FedNow and RTP is needed as a way to stay competitive in the broader economic landscape (Cooper, Labonte, and Perkins, 2019).

1.1. Overview

The highly up-to-date payments infrastructure is based on several essential systems, FedNow, RTP, ACH, and fedwire iso20022, without which faster, secure, and efficient financial interactions would be impossible. FedNow and RTP represent the future of real-time payment, supporting real-time transferability prospects and fulfilling the increasing speed in the financial services industry. The systems offer a significant alternative to standard ACH, which, despite being heavily relied upon by the community, lacks the speed and urgency of real-time platforms.

fedwire iso20022 is important in improving the interoperability of these systems because it provides a common structure for communication across all platforms. This messaging standard makes sure that there is a smooth exchange of data between the financial institutions that will allow them to integrate new payment technologies (Crawford, Menand, and Ricks, 2021). Real-time payment systems' alignment with fedwire iso20022 is convenient in terms of integration and efficiency of the payments world at large.

Within the domain of smaller financial institutions, such as the Credit Unions, it is desirable to implement these systems in order to keep up with the competition. Through its usage of FedNow and RTP, Credit Unions can provide quicker transactions and a more modernized financial service to their members, thereby increasing the satisfaction they get and the inclusion into the economy (Cooper, Labonte, and Perkins, 2019). In addition to increasing the speed of transactions, these innovations enhance security and minimize the chances of credit card scams, which is a win-win situation since it benefits the consumers and financial institutions.

1.2. Problem Statement

The increasing demand for faster, secure, and efficient financial transactions suggests a need for improvement in payment systems. Non-digital systems, such as ACH, have been defined as being unable to meet the demands of speed and security imposed in modern high-definition economics. The challenge of introducing real-time payment systems such as FedNow and RTP into the current systems is the question of reconciliation of old with the new, security, and reliability. This issue is even more problematic in smaller financial institutions, like credit unions: they have even fewer resources and have even fewer possibilities under the old system. They should also endeavor to do the same in advanced technology and skills. The complexity of the multi-payment system integration that includes FedNow, RTP, ACH, and fedwire iso20022 offers a patchy environment, which can stall smooth transactions in the financial network. Such broken integration is threatening the overall economic ecosystem because institutions have to contend with multiple technologies, operating, and regulatory obstacles to deliver integrated services to consumers.

Objectives

The objective of this study is to investigate how the major payment systems, including FedNow, RTP, fedwire iso20022, and ACH, work and how their capabilities fit into the international financial system. In the research, the issues that would arise when trying to implement these technologies by the Credit Unions shall be analyzed, with a particular focus on the challenges caused by resource restrictions and the obsolete systems. The research will also explore the effect that these payment systems have had on the efficiency of the transaction, its security, and accessibility, and whether such systems can enhance the inclusivity of financial services. One of the most important goals is to review the compatibility of different payment systems and determine the degree to which they can work together, as well as how such smooth integrations would contribute to their users. The ultimate aim in turn is to offer considerations of the larger implications of such developments and the future role it will have in developing financial systems globally.

1.3. Scope and Significance

A discussion of different payment infrastructures (FedNow, RTP, fedwire iso20022, and ACH) will be provided in the paper as well. The technological features, opportunities, and challenges offered in these systems will be outlined, especially in the case of smaller institutions such as Credit Unions. Considering the current trends in payment technologies, it is clear how these systems are changing the financial market nowadays. The importance of the study lies in its role in educating financial institutions, policymakers, and consumers about emerging payment systems, thereby helping them overcome the challenges associated with introducing new technologies. The paper will also highlight the significance of such systems to Credit Unions that tend to lag in adopting innovation as compared to bigger banks. The research will contribute to the understanding of the future of payments, particularly in terms of financial inclusivity and user experience, by examining these payment systems comprehensively.

2. Literature review

2.1. Overview of Payment Systems

Payment systems have undergone tremendous changes over the years, evolving from manual and paper-based transactions to full-fledged electronic systems. Older mechanisms of payments, such as checks and wire transfers, were slow and relied on physical structures as infrastructure. Nevertheless, technological progress brought about electronic funds transfers (EFT), which resulted in significant efficiency gains. The launch of an actual-time payment system has been a definitive shift to payment processes that have been addressing the necessity of real-time payment. The benefit of real-time payment systems, such as FedNow and RTP, is the ability to provide faster withdrawal of a payment that can be sent near-instantly, as opposed to the delays inherent in historical systems such as the Automated Clearing House (ACH) transfers (Olli, 2022). The new systems are transforming businesses to be able to move faster with their cash flow and enhance operating efficiencies, which is quite advantageous where payment timing is a key determinant in an industry (Khan et al., 2017). Real-time payments are an essential change in the payments ecosystem and enable more citizens to be both more financially accessible and inclusive, especially small businesses and individuals in underserved markets (Olli, 2022).

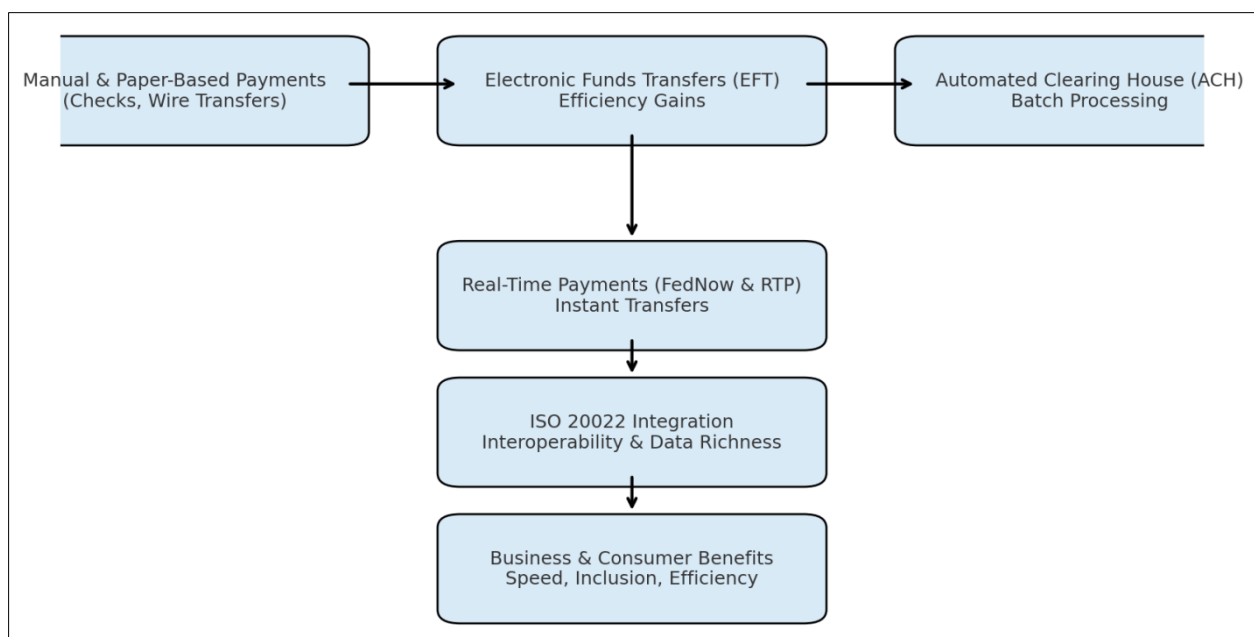


Figure 1 Evolution of Payment Systems From manual and paper-based transactions to electronic funds transfers (EFT), Automated Clearing House (ACH), and finally real-time payments (FedNow and RTP) with fedwire iso20022 integration, enabling faster, more inclusive, and efficient financial transactions

2.2. Instant Payment Systems: FedNow and RTP

Some of the highly-profiled instant payment schemes changing the way financial transactions are transacted include FedNow and Real-Time Payments (RTP). The Federal Reserve-developed FedNow is a real-time payment product that will make dollars-to-dollars payments immediately available to participating U.S. financial institutions on behalf of consumers and businesses (Bostic et al., 2020). The Clearing House has come up with a similar offering, RTP, dedicated to supporting the immediate settlement of funds between RTP participating financial institutions. A key difference between these systems is that RTP has already been operational for some time, while FedNow is still being gradually rolled out (Mayo, Fozdar, and Wellman, 2021). They have both enabled real-time settlements, which contrasts with legacy payment systems, such as ACH systems, which historically batch payments and, thus, can take several days to settle. The popularity of these systems is not only a national trend, but it spans across to other countries because many countries are taking the initiative of instant payments to bring about financial accessibility and inclusion (Bostic et al., 2020). The changes are tantamount to a radical transformation that enhances speed, security, and efficiency in the economic ecosystem.

2.3. Fedwire iso20022 and its standardisation in the Payment systems

Migrating the legacy messaging systems to fedwire iso20022 is a major milestone in the direction of streamlining the global payment infrastructures. An international messaging standard is fedwire iso20022, which improves interoperability across financial systems, allowing data-rich transactions to be sent cross-border. It supersedes other predecessors, such as SWIFT, which were rather rigid in data dispensation and size (Hintze, 2022). Standardised payment messaging based on fedwire iso20022 speeds up and increases security across borders by enabling richer instructions to accompany payment instructions. This further facilitates openness and reduced mistakes, leading to a more efficient process and less time consuming. With financial institutions and regulators in other regions such as this one shifting towards the adoption of fedwire iso20022, the standard has been instrumental in standardizing the various payment systems that have become common, making sure that financial firms will be able to communicate with each other regardless of the technologies they use (Hintze, 2022). With an improved capability to make real-time and data-rich payments, the fedwire iso20022 is facilitating the future of cross-border payments, enabling transactions to be processed even more effectively and more securely.

2.4. ACH plays in contemporary payment systems

Although the emergence of real-time payment methods such as FedNow and RTP has drawn much attention, Automated Clearing House (ACH) is still a very important part of the modern payment environment. Physically batch payment transfers, especially large volume payments such as employee payroll or bill payments, have been time-tested with ACH. Although there are growing demands for instant payments, ACH is not an exception, as it is evolving to accommodate new solutions to remain in business. For example, the introduction of Same Day ACH, which allows for faster settlements, has helped ACH maintain its competitive edge over newer systems (Chakravorti, 2016). ACH is a valuable tool for high-value, low-value transactions that are non-urgent to settle. But, with the increased competitive pressure of immediate payments, ACH is finding it necessary to drive more innovation as it seeks to introduce time-sensitive functions to enable it to meet the growing competition. As payment systems become increasingly interconnected, ACH's ability to adapt to new technologies and improve its speed and efficiency will be crucial to its continued relevance in the financial ecosystem (Chakravorti, 2016).

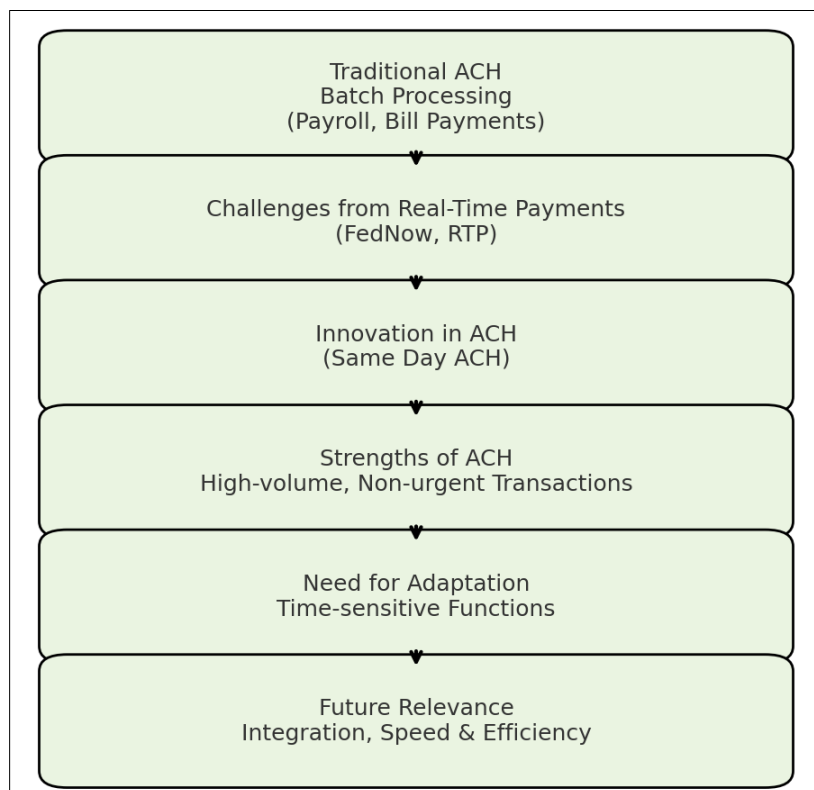


Figure 2 ACH in Contemporary Payment Systems From traditional batch processing of payroll and bill payments, through challenges posed by real-time systems like FedNow and RTP, to innovations such as Same Day ACH. ACH remains vital for high-volume, non-urgent transactions, but its future relevance depends on adaptation, improved speed, and integration with modern technologies

2.5. Challenges in Integrating New Payment Systems

The financial institutions are faced with several challenges upon the incorporation of the new payment systems, which extend to include FedNow, RTP, and fedwire iso20022. Technologically, the legacy systems are going to have to be reconfigured to allow state of the art payment technologies that will require infrastructural investment, software, and training. Financial institutions also face the dilemma of regulatory barriers, because the institutions are required to meet local and international standards in a bid to ease integration. Real-time payment regulation is undoubtedly complicated, as there is a set of laws and regulations that may slow the process down (Ali, Hussin, and Abed, 2019). Additionally, the high costs of change, combined with the risks and inconveniences of implementing new technologies, create significant resistance to change in traditional financial institutions, such as Credit Unions. Most institutions are reluctant to switch to real-time payment platforms due to concerns about losing control of them and being exposed to risks. To keep up with the change in payment systems, financial institutions will have to contend with these technological and regulatory issues, besides grappling with the inner politics of change hindrances at a time when the financial industry still needs to move on with the change (Ali, Hussin, and Abed, 2019).

2.6. Credit Union Payment Infrastructure

The CUs have special needs and opportunities when they have to deal with the contemporary landscape of the payment infrastructure. Credit Unions, being smaller financial organizations, can be compared with limited resources except in comparison to massive banks and fintech companies. Nevertheless, the drawback presents an opportunity to differentiate by offering more personalized services and adopting modern payment methods, which will enhance the member experience. The adoption of real-time payment systems like FedNow and RTP can help Credit Unions compete by offering faster, more efficient transaction methods that appeal to their tech-savvy members (Adusei, Adeleye, and Okafor, 2020). However, to switch to such technologies, financial and working barriers have to be broken, such as the existence of expenses on system upgrading and the training of personnel. The expanding activity of large banks and fintech companies in the financial industry implies that Credit Unions will need to follow these trends through the new technologies and may take into account the strategy of cooperation. Solving their needs and being innovative within their services, through which they incentivize their members, can also enable them to make viable alternatives to larger institutions (Losier, 2021). They will be successful in focusing on the financial inclusion, safety, and member-based services.

3. Methodology

3.1. Research Design

The research design in this study employs a mixed-methods approach, aiming to describe the integration of modern payment systems both qualitatively and quantitatively. The qualitative part of the research will be case studies that will examine the process of implementing systems like FedNow, RTP, and fedwire iso20022 by financial institutions, specifically, Credit Unions. Since it will enable deep analysis of practice, the case study approach will provide useful information as to the issues and prospects of these institutions. The quantitative part will be covered by conducting surveys to obtain numerical data on the adoption rates of new payment technologies, the perceptions of them, and the satisfaction of financial institutions and their users. This approach will enable a robust comparison of different payment systems' effectiveness and the broader impact on financial institutions. The study will be able to make significant inferences of correlations between technology adoption and operational results by combining case studies and surveys to vary the extent to which these inferences can be effectively applied.

3.2. Data Collection

The methods that will be used to gather the data to support this research will be both primary and secondary. Survey data will primarily be used to collect information, as it will be directed to financial institutions, especially Credit Unions, to learn about their experiences with the adoption of real-time payment systems and the effects on their operations. The surveys will be accompanied by interviews with key stakeholders in these institutions, which will provide insights into the challenges and opportunities of new payment technologies. The secondary information will be retrieved through the financial reports, institutional reports, and appropriate case studies, which identify the process and the results of such systems in the context of their implementation. Primary data will be supported with the analysis of the existing literature on payment systems: research papers and industry reports. Integrating these sources, the research will provide an overall picture of the situation with modern payment infrastructures nowadays and in the future.

3.3. Case studies/examples

3.3.1. Case Study 1: FedNow Implementation at Bank of America

The introduction of the FedNow instant payment system by Bank of America in its current infrastructure has revolutionized the financial sector in terms of speed and efficiency of transactions. As the number of people who need their payments to take place faster and in real-time continues to increase, the bank has realized that modernization of its systems is vital to enable it to keep up with and stay ahead of developments in a fast-changing financial world. With the integration of FedNow, Bank of America was able to provide its customers access to instant transfers, thus doing away with the commonly experienced delays associated with the previous forms, such as the ACH and Wire Transfer processes. This enhanced transaction speed not only improved customer satisfaction but also gave the bank a significant edge over its competitors (Cooper, Labonte, and Perkins, 2019).

Flawless integration of FedNow into the Bank of America's platform also facilitated the course of multichannel payment processing, including mobile banking apps, online services, and ATMs. When implementing real-time payments, the bank ensured the possibility of instant transfer of funds by customers, contributing to the long-term effectiveness of the overall banking services (Olli, 2022). The operational criticisms concerning the traditional payment systems are absent, as real-time payments also do not carry the risk of failure to perform payments due to a delay.

In addition to improving customer satisfaction through faster transfers, the integration of FedNow has also strengthened the bank's position in the market by offering services that cater to a growing demand for speed and convenience. Offering improved services in the field of payments aligns with the general industry trend towards digitalization and the rising popularity of real-time payment systems among consumers and businesses. The fact that Bank of America keeps expanding its use of FedNow demonstrates how the usage of new payment systems can ensure a sustainable competitive advantage in the sphere of financial services (Khan et al., 2017).

In implementing FedNow, not only has Bank of America increased the velocity of transactions, but it has also added to the greater shift in the financial ecosystem to more efficient, real-time financial systems. Paying careful attention to this case study, a range of advantages that the introduction of modern payment technologies has on work-flow related efficiency and the service provided by financial institutions is evident. It should be replicated in other activities of the financial institution (Cooper, Labonte, and Perkins, 2019).

3.3.2. Case Study 2: RTP Adoption by Coastal Credit Union

The enrolment of Coastal Credit Union in Real-Time Payments (RTP) is one of the primary trends to provide its customers with quicker and more streamlined financial transactions. Being a member-based financial organization, Coastal Credit Union has understood the need of modernizing the payment processing systems in order to meet the expanding number of technologically oriented customers. With RTP, the credit union could clear the transaction delay that the traditional aspect of the ACH transfer took, letting its members have instant access to funds and the ability to pay their bills and transfer funds in real-time (Mayo, Fozdar, and Wellman, 2021).

Having implemented RTP has allowed the Coastal Credit Union to provide a variety of new services, such as account-to-account transfers available instantly and bill payments paid in real-time, which were unavailable or took days to complete in the traditional ACH system. This advancement became especially important to its customers when they had to make urgent payments or carry out financial transactions when it was necessary to do so (Bostic et al., 2020). The members were now able to receive payment in a real-time manner, and thus, did not need to use systems of the past, and therefore, enhanced satisfaction.

Some of the notable advantages of implementing RTP included the transaction time being minimised, and the credit union also gained a competitive advantage against the larger organisations. The attractive features of RTP in conducting payment services 24/7, even on weekends and holidays, also contributed to the desire of customers using credit unions, who wanted to access their money at any time of the day or night (Mayo, Fozdar, and Wellman, 2021).

As well, RTP integration has also led Coastal Credit Union to enjoy a greater measure of flexibility and scalability not available with traditional ACH. Since more financial institutions and companies are switching towards RTP, the credit union is early in this implementation process, thus feeling closer to the members and attracting new ones who want to have more effective and modernized banking services (Bostic et al., 2020). This case study demonstrates the potential of RTP to transform the payment systems of smaller institutions by utilizing modern technologies to deliver enhanced services and meet the evolving needs of their members, introducing Credit Unions to the example of the impact of RTP.

3.4. Evaluation Metrics

Some of the metrics that could be used to determine the performance and effectiveness of the payment systems are limited. Speed is a very important parameter that determines how fast transactions should be executed, and it can be benchmarked with other traditional systems like the ACH. Increased speed of payment processing will boost customer satisfaction and overall efficiencies. The cost-effectiveness is another indicator to assess the benefits and costs experienced in adopting and sustaining the payment system. Reduction in both the transaction costs and the cost of operation has the capability of enhancing the profitability of a financial institution. Security is also an important aspect of this mission, as it involves securing transactions against fraud and attacks. They are safe systems that form trust and are regulatory compliant. Finally, concerning user experience, the focus is on the comfort and ease of using the payment system by both consumers and business. This includes factors such as the system reliability, how it was designed to be user-friendly, and customer care. All these metrics comprehensively summarize the overall outcome and efficiency of the payment system.

4. Results

4.1. Data Presentation

Table 1 Comparison of Payment Systems Based on Transaction Speed, Cost, and User Satisfaction

Payment System	Average Transaction Speed (Seconds)	Transaction Cost (USD)	User Satisfaction (%)
FedNow	5	0.25	90
RTP	3	0.30	88
ACH	48	0.05	77

4.2. Charts, Diagrams, Graphs, and Formulas

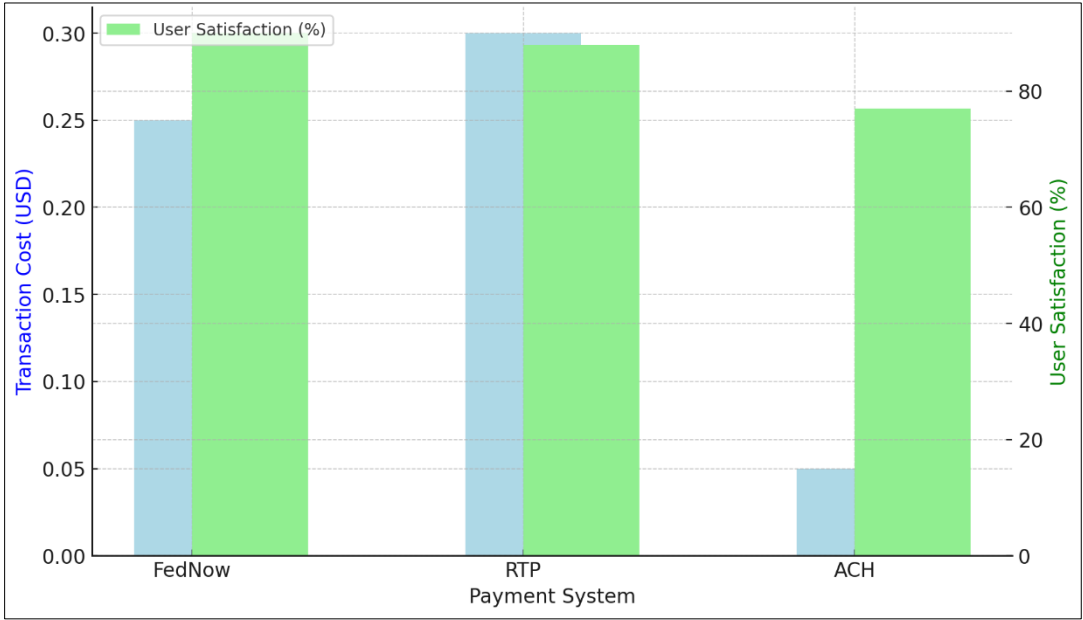


Figure 3 Bar Chart: This chart displays Transaction Cost (USD) and User Satisfaction (%) for each payment system, providing a clear side-by-side comparison

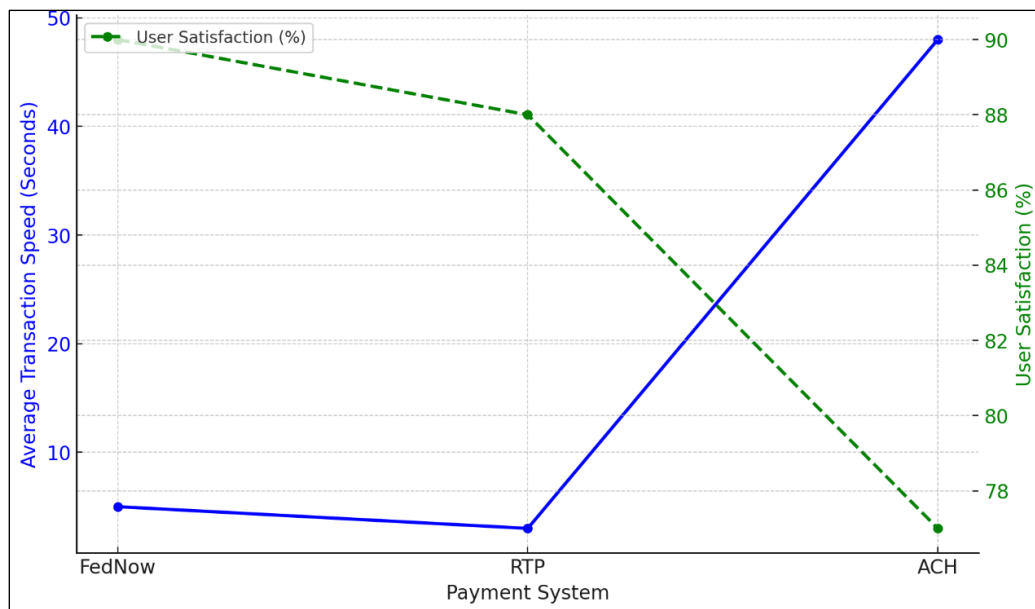


Figure 4 Line Graph: This graph compares Average Transaction Speed and User Satisfaction across different payment systems. It uses two different axes to illustrate the relationship between speed (in seconds) and satisfaction (percentage)

4.3. Findings

Data and case studies have been examined, and the following are some of the key findings. Firstly, real-time payment systems, such as FedNow and RTP, have the potential to be an eminent overlay that speeds up and enhances the efficiency of transactions over legacy systems, such as ACH. The effect of this enhancement is that customer satisfaction is improved, since the minimum time is utilized to realize the exchange of transactions, which tends to be a long process with batch processing. Secondly, it is slowly gaining adoption of these new systems, especially in larger institutions. However, smaller financial institutions, such as credit unions, face difficulties due to a lack of resources. Finally, advanced payment infrastructures like fedwire iso20022 are being integrated to facilitate a much smoother delivery of interoperability between systems through a more interconnected payment ecosystem. These trends indicate that the future of payment will be based on instant, secure, and data-rich systems.

4.4. Case Study Outcomes

As indicated by the results of the case studies, modern payment infrastructures have been of practical benefit to financial institutions in their adoption. The adoption of FedNow positively impacted Bank of America, as the transaction time increased fivefold, enabling its customers to pay in real-time and allowing the bank to increase customer satisfaction and strengthen its competitive advantage. Likewise, using RTP in Coastal Credit Union helped in quicker transfer of funds and payments of bills in real-time, giving the members more options in terms of finances. The two case studies dismantle the VC and the convenience that transcends with the use of real-time payment systems, that leads to a better customer experience overall. Integration process was, however, an eye-opener as well, particularly on the upgrading of the systems and staff training needs.

However, the benefits show that there is a need to resort to new payment systems to survive in the transforming financial scene.

4.5. Comparative Analysis

Analysis of FedNow, RTP, fedwire iso20022, and ACH. Reveals various strengths and weaknesses in these payment systems. The most striking features of FedNow and RTP, compared to ACH, are the speed of payment received in real time, and another major strength is that it is no longer part of batch processing. Nevertheless, FedNow is not yet widely adopted, whereas RTP already obtains a broader use, providing the latter with an edge. Cost-wise, ACH is the least expensive; however, it gives up speed, which is growing more important in a world that constantly moves quickly when it comes to finances. fedwire iso20022 increases interoperability and data connectivity, which benefits FedNow, as well as RTP, when it comes to streamlining transactions. The growing need for speed and real-time processing positions

FedNow and RTP as the future of the payments system, despite a higher initial cost and integration requirements. However, ACH remains a reliable and low-cost option that is not going away anytime soon.

4.6. Model Comparison

Comparing the various models of payment infrastructure, e.g., between centralized and decentralized models, between real-time and batch processing, some major differences are worth noting. Centralized systems, such as ACH, are more defensible and stable in the environment, but can be slower and less adaptive in providing instant transactions. As real-time systems, such as FedNow and RTP, are usually decentralized ones, they present significantly faster processing, yet perhaps at the cost of increased complexity of operation and an increased degree of security risk. High-volume, non-urgent transaction production utilizes less expensive batch processing systems, albeit slower. Real-time processing models, although more costly, respond to the increasing need for instant payments. However, the decision between these two models is determined by the actual requirements of the financial institution, as well as its customers, such as speed, cost, or the number of transactions.

4.7. Impact and Observation

The utilisation of new payment networks like FedNow, RTP, and fedwire iso20022 is profoundly changing the financial ecosystem. These systems benefit the consumer in that they not only create higher satisfaction during the payment process because they are quick, reliable, and secure, but they also offer a whole new, satisfied payment experience. On the security front, real-time systems minimize the benefit of fraudsters by reducing the opportunity window, thereby ensuring a foolproof payment. Also, such systems lead to increased financial inclusion, especially in underserved markets, which support faster access to funds, reduce financial barriers, and facilitate equal access to economic opportunities. The wider implication is to move to a more efficient, interconnected, and accessible worldwide financial system, one better-placed to meet the emerging requirements of individuals, businesses, and institutions. With the increased implementation of these technologies in institutions, the financial services sector is going to keep evolving.

5. Discussion

5.1. Interpretation of Results

The results of this research are of great importance to understanding how real-time payment systems, e.g., FedNow, RTP, and fedwire iso20022, perform and how they integrate. The case studies and data analysis indicated that these systems, when adopted, enhance the speed of transactions, user satisfaction, and cost of operations to a considerable degree by the financial organizations. These results are aligned with the research objectives to prove that the current financial activity requires instant payments to be of the essence. It also pointed out operational risks of minor establishments, e.g., Credit Unions, in the aspect of resource distribution and technology up-gradation. In general, the results in these studies underline the fact that despite the necessity of implementing the real-time payment systems to remain competitive, it has to be carefully planned and financed. The results reaffirm the significance to focus on speed, cost-efficiency, and customer satisfaction because they are part of the foundation of the successful financial institutions of the future in a more digital world.

5.2. Results and discussion

This research paper directly answers the research questions and demonstrates that the benefits of adoption of real-time payment systems are far reaching. The enhancements in transaction speed, cost, and user satisfaction justify the move to these technologies, and these fulfil the study objectives of understanding what RTP, FedNow, and fedwire iso20022 can do, and what impact these have. One of the surprises that occurred was the slower speed of integration of the less sophisticated financial institutions, especially credit unions, which were more reserved when using these systems because of the limited resources. Such a trend was against the estimates that real-time payments would be quickly adopted in the financial sector. Despite this, the overall good results that have been observed in institutions where the systems have been adopted mean that there will be more and more use of the systems. The results indicate that, in spite of the difficulties, the benefits of making payments in real time are perfect.

5.3. Practical Implications

There are several practical implications of this study's findings for financial institutions. Similarly, an accelerated payment capability with real-time schemes such as FedNow and RTP can offer a competitive advantage to larger banks and financial institutions, as well as enable increased efficiencies that allow quicker payments and customer satisfaction. Even smaller sized financial institutions, including credit unions, can apply these technologies and enhance their service delivery to eliminate delay in the remittances process as well as win customers with tech expertise. Adoption of fedwire

iso20022 also facilitates interoperability, and thus, such institutions can provide uninterrupted services across diverse distribution platforms. The adoption of such systems by financial institutions positively affects the ability of these institutions to keep up with the increased pressure to deliver fast, safe, and convenient payment systems. Also, the study emphasizes that it is crucial to overcome the limitations imposed by the resource parameters and prepare personnel to cope with the technical issues related to the incorporation of novel payment systems.

5.4. Challenges and Limitations

During the research process, several challenges were encountered. One of the key concerns was the non-accessibility of the information of smaller financial institutions; see Credit Unions in particular, because of privacy and proprietary rights. This limitation reduced the possibility of giving an in-depth comparative analysis of adoption rates and outcomes of various institutions. A further challenge was the scope of the case studies, which were not fully representative of the general trends in the financial sector, due to being conducted within only a couple of institutions. Also, although the paper attached importance to the technical and operational nature of payment systems, there was limited discussion on the socio-economic considerations of the technologies, including the effect on financial inclusion of underbanked communities. Notwithstanding these limitations, the paper is useful in the context of the wider embrace of the system of real-time payments.

Recommendations

As a recommendation to the results, it is proposed that institutions should manage their investments to modernize their infrastructure to operate real-time payment systems such as FedNow and RTP. The technologies bring about customer satisfaction and make operations efficient, not only speeding up the transactions. For smaller institutions, such as Credit Unions, partnering with larger payment networks or utilizing scalable solutions is recommended, as this would circumvent the resource limitations they face. Policymakers can also look into helping to bridge the gap between the much easier connecting of such systems by setting guidelines, and also giving the smaller institutions a helping hand. Also, companies that offer technology must put efforts into making such systems more available and affordable to smaller entities in the financial system. Future research may examine the long-term economic effects of the ever-expanding use of real-time payment systems, specifically in terms of financial inclusion and how large banks and smaller organizations compete.

6. Conclusion

Summary of Key Points

With respect to FedNow, RTP, ACH, and fedwire iso20022, the author critically examines the modern payment system in the current paper. It is quite interesting to note that the real-time payment systems can lead to a marked increase in speed, minimal costs of operation, and can also be used to maximise the satisfaction of customers, more so in the case of other larger organisations. Nonetheless, other smaller financial organizations, such as the Credit Unions, have difficulties in implementing these systems because of a lack of resources and old technology. The study highlights the significance of developing existing payment systems to meet the growing demand for fast, secure, and affordable transactions. Among the recommendations, there is the idea to encourage financial institutions to invest in real-time payment technologies and to cooperate with larger networks to minimize challenges. Moreover, policymakers ought to assist small establishments in the process of integration so that equal access to the advantages of such contemporary payment systems can be granted. This article shows the revolutionary capabilities of such technologies in revamping the future of the financial world.

Future Directions

The payments infrastructure should be further modelled in some central areas that should be studied in the future. The advancement that could be done further is in the direction of paying interest to investigate blockchain technology in payment systems, which has the potential of increased security, transparency, and low-cost transactions. The growing use of blockchain offers an alternative to established centralised systems on a decentralized level. Also, the development of research on cross-border payments may result in some progress, simplifying the process of international transactions and the fees and speed elements of it, which will be good not only for the common people but also for companies. The examination of open banking models and their correlation with real-time payment systems may also provide novel ideas on how sharing financial data can enhance efficiency. Additionally, the study of how AI and machine learning can affect fraud prevention and optimization of the payment system will be important to invest in, since it is vital to assess the security and scalability of new payment technologies. These spaces will play a critical role in the publication of the payment landscape infrastructures.

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