

Acceptance of Concessionaires on the Efficiency of Cashless Payment Systems of Local Water Districts in Isabela

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ABSTRACT: *This study examined concessionaires' acceptance of the efficiency of cashless payment systems in selected Local Water Districts in Isabela, specifically Alicia and the City of Ilagan. It evaluated system efficiency in terms of functionality, usability, and reliability, and determined differences in collection efficiency before and after adoption, particularly in payment timeliness and transaction processing speed. A descriptive-comparative and pre-post research design was utilized, involving 291 respondents selected through appropriate sampling techniques. Data were gathered using a validated survey instrument and analyzed using frequency, percentage, weighted mean, t-test, and one-way ANOVA. Findings revealed that cashless payment systems were perceived as highly efficient across all dimensions. A significant improvement in collection efficiency was observed following implementation, while no significant differences were found when respondents were grouped according to demographic characteristics. Despite these positive outcomes, challenges such as limited awareness of cashless payment systems and reliance on internet connectivity persist. In response, the study proposes the Cashless Payment Enhancement Program (CPEP) to strengthen adoption and optimize utilization among concessionaires.*

KEYWORDS – *Cashless payment systems, collection efficiency, Local Water Districts, payment timeliness, transaction processing speed*

I. INTRODUCTION

The rapid shift toward digitalization has transformed financial transactions worldwide, with cashless payment systems becoming integral to modern economic and service infrastructures. Digital platforms such as mobile banking, e-wallets, and online payment portals have enhanced transaction efficiency, improved transparency, and reduced processing time, thereby reshaping how organizations and consumers manage financial activities. In public service sectors, including utilities, the adoption of cashless systems is increasingly viewed as a strategic approach to improving operational efficiency and service delivery.

Previous studies have consistently demonstrated the benefits of digital payment systems across various contexts. Empirical evidence shows that cashless transactions improve revenue collection, reduce delays, and streamline financial processes (Muthinja & Ngahu, 2021; Wekesa et al., 2022). Similarly, studies on consumer behavior highlight that factors such as digital literacy, trust, and accessibility significantly influence the adoption of cashless payments (Dinh, 2024). In the Philippine context, initiatives led by the Bangko Sentral ng Pilipinas have accelerated digital payment adoption, resulting in substantial growth in electronic transactions and improved financial inclusivity. Despite these advancements, existing literature largely focuses on urban settings and private institutions, with limited attention given to public utilities in rural areas.

This gap is particularly evident in Local Water Districts (LWDs) in provinces such as Isabela, where reliance on traditional, over-the-counter payment systems remains prevalent. Although some districts have introduced digital payment options, adoption rates among concessionaires remain low, limiting the realization of potential

efficiency gains. This raises a critical issue: the effectiveness of cashless payment systems is not solely determined by their availability but by user acceptance and actual utilization.

In response, this study examines the acceptance of concessionaires regarding the efficiency of cashless payment systems in selected Local Water Districts in Isabela. Specifically, it evaluates system efficiency in terms of functionality, usability, and reliability, and determines the differences in collection efficiency before and after adoption, focusing on payment timeliness and transaction processing speed.

The study contributes to the existing body of knowledge by providing empirical evidence on cashless payment adoption in rural public utility settings—an area that remains underexplored in current literature. It offers practical insights for water district administrators, policymakers, and technology providers by identifying adoption barriers and proposing targeted strategies to enhance system utilization. Ultimately, the findings aim to support more efficient, inclusive, and sustainable financial service delivery in local water districts.

II. METHODOLOGY

This study employed a descriptive-comparative and pre-post research design to assess the perceived efficiency of cashless payment systems and the differences in collection efficiency before and after their utilization in selected Local Water Districts in Alicia and the City of Ilagan, Isabela. A total of 291 concessionaires, selected through purposive sampling from a population of 1,185, served as respondents. Data were collected using an adapted and pilot-tested survey questionnaire with established reliability through Cronbach’s alpha. The instrument utilized two 4-point Likert scales to measure system efficiency (functionality, usability, and reliability) and the effects of cashless transactions (payment timeliness and transaction processing speed). Data gathering followed ethical procedures, including securing permissions and informed consent. The collected data were analyzed using frequency and percentage for respondent profiling, weighted mean for determining levels of efficiency and effects, t-test for assessing differences before and after utilization, and one-way ANOVA for identifying differences in perceived efficiency when grouped according to demographic variables.

III. RESULTS AND DISCUSSIONS

3.1 Profile of the Respondents

Table 1. Demographic Profile of the Respondents

Profile	Frequency (n=291)	Percent (%)
Age		
20 – 29	64	21.99
30 – 39	95	32.65
40 – 49	115	39.52
50 – 59	16	5.50
60 and above	1	0.34
Sex		
Male	100	34.36
Female	191	65.64
Educational Attainment		
Elementary	12	4.12
High School	107	36.77
Vocational	5	1.72
College	167	57.39
Household Income		
Less than P10,000	73	25.09
10,001 - 25,000	131	45.02
25,001 - 50,000	78	26.80
50,000.00 and above	9	3.09

Years in using LWD service		
1 to 2 years	98	33.68
3 to 5 years	94	32.30
Less than 1 year	30	10.31
More than 5 years	69	23.71

The demographic profile of respondents provides essential context for interpreting perceptions of cashless payment systems. As shown in Table 4, respondents were classified according to age, sex, educational attainment, monthly household income, and years of using Local Water District (LWD) services.

Most respondents were aged 40–49 (39.52%), followed by those aged 30–39 (32.65%) and 20–29 (21.99%), indicating that the majority were in their prime working years. Female respondents comprised 65.64% of the sample, suggesting a higher involvement of women in managing household utility payments. In terms of educational attainment, the majority were college graduates (57.39%), followed by high school graduates (36.77%), reflecting a relatively high level of educational background that may support digital payment adoption.

Regarding income, most respondents belonged to low- to middle-income groups, with 45.02% earning ₱10,001–₱25,000 monthly. In terms of service usage, the largest proportion had been concessionaires for 1–2 years (33.68%) and 3–5 years (32.30%), indicating sufficient experience with LWD services.

Overall, the diversity in demographic characteristics provides a reliable basis for assessing variations in perceptions and highlights the importance of tailoring cashless payment strategies to different user groups to enhance adoption and efficiency.

3.2 Level of Collection Efficiency of Cashless Payment Systems in Local Water Districts

Table 2. Level of Efficiency of the Cashless Payment Systems in Terms of Function

Indicator	Mean	Descriptive Rating
1. The system works well on different devices	3.73	Highly Efficient
2. The use of cashless transactions makes me fully understand its concept	3.75	Highly Efficient
3. Using the system would enable to accomplish task more quickly	3.83	Highly Efficient
4. The system provides new ideas based on the interaction of cashless transactions	3.73	Highly Efficient
5. Overall, the cashless transactions are very functional	3.85	Highly Efficient
Grand Mean	3.78	Highly Efficient

The table presents respondents' perceptions of the cashless payment system in terms of functionality, as reflected in the mean ratings and their interpretations. The indicators assess the system's effectiveness in supporting daily payments, ease of use, transaction speed, innovation, and overall operational performance.

The grand mean of 3.78, interpreted as "highly efficient," indicates that respondents generally perceive the system as functionally effective. This reflects its ability to meet operational needs while enhancing convenience and user satisfaction. The highest-rated indicator, "overall, the cashless transactions are very functional" (M = 3.85), suggests strong user confidence in the system's capacity to support payment processes. Likewise, the item "using the system enables me to accomplish tasks more quickly" (M = 3.83) highlights its contribution to improved efficiency and reduced transaction time.

Other indicators, including user understanding of the system (M = 3.75), device compatibility, and innovation (both M = 3.73), indicate that functionality also encompasses accessibility and adaptability to users' needs. Overall, the consistently high ratings demonstrate that the system enhances transaction speed, convenience, and reliability.

These findings are consistent with literature indicating that digital payment systems improve efficiency by streamlining processes and minimizing errors (Kumar & Reinartz, 2021). However, studies also note that security concerns, infrastructure limitations, and insufficient technical knowledge may constrain optimal system

performance (Alalwan et al., 2023). Thus, while functionality is generally rated highly, addressing these limitations remains essential to fully optimize system effectiveness.

Table 3. Level of Efficiency of the Cashless Payment Systems in Terms of Usability

Indicator	Mean	Descriptive Rating
1. The system is very useful for paying water bills online	3.87	Highly Efficient
2. The system is user friendly	3.88	Highly Efficient
3. The system provides easy access to paying monthly bills	3.90	Highly Efficient
4. Cashless transactions system makes it easier for me to pay water bills	3.92	Highly Efficient
5. Overall, the cashless payment is easy to use	3.92	Highly Efficient
Grand Mean	3.90	Highly Efficient

The grand mean of 3.90 indicates that respondents perceive the cashless payment system as highly efficient in terms of usability, reflecting its effectiveness in simplifying financial transactions and enhancing user convenience. The highest-rated indicators, “cashless transactions system makes it easier for me to pay water bills” and “overall, the cashless payment is easy to use” (both 3.92), highlight the platform’s ability to streamline payment processes by reducing cognitive and operational effort. This ease of use supports faster transactions and promotes sustained user engagement.

Similarly, the indicator “the system provides easy access to paying monthly bills” (3.90) underscores the platform’s role in facilitating timely and convenient bill payments, while “the system is user friendly” (3.88) reflects an intuitive interface that minimizes the learning curve. The indicator “the system is very useful for paying water bills online” (3.87) further confirms its practical value in everyday utility transactions. Collectively, these findings suggest that usability enhances not only operational efficiency but also user satisfaction and trust.

These results are consistent with prior studies indicating that intuitive and user-friendly digital payment platforms improve transaction efficiency and service delivery (Albastaki, 2024). However, usability may be constrained by users’ digital skills and technological limitations, including system errors and connectivity issues (Wang et al., 2023). Thus, while usability is rated highly, addressing user capability and system reliability remains essential to sustain adoption and optimize performance.

Table 4. Level of Efficiency of the Cashless Payment Systems in Terms of Reliability

Indicator	Mean	Descriptive Rating
1. The system consistently performs according to its specifications	3.79	Highly Efficient
2. The system recovers quickly during technical problems	3.82	Highly Efficient
3. Potential threats and vulnerabilities that could affect system reliability are addressed	3.86	Highly Efficient
4. Transactions go through securely and reliably	3.90	Highly Efficient
5. The cashless payment is reliable to use	3.91	Highly Efficient
Grand Mean	3.86	Highly Efficient

The overall grand mean of 3.86, interpreted as “highly efficient,” indicates that respondents perceive the cashless payment system as dependable, consistent, and secure, supporting smooth water bill transactions and continued adoption.

The indicator “the cashless payment is reliable to use” (3.91) obtained the highest mean, reflecting strong user confidence in system dependability. This is followed by “transactions go through securely and reliably” (3.90), emphasizing perceived transaction integrity and data security. Meanwhile, “potential threats and vulnerabilities that could affect system reliability are addressed” (3.86) suggests that users recognize proactive risk management that sustains system stability.

Further, “the system recovers quickly during technical problems” (3.82) reflects perceived resilience, while “the system consistently performs according to its specifications” (3.79), though lowest, still indicates a highly efficient level of baseline performance.

These findings align with Madhavedi et al. (2024), who noted that reliable digital payment systems strengthen user trust and encourage adoption by reducing uncertainty. In public utilities such as Local Water Districts, reliability is essential for uninterrupted service and efficient revenue collection. However, Anico (2025) highlighted that cybersecurity risks, system errors, and connectivity issues may still hinder trust and adoption.

In conclusion, the system is perceived as highly reliable, but sustaining user confidence requires continuous improvement in cybersecurity, system stability, and technical performance.

3.3 Difference in Collection Efficiency Before and After Utilization of the Cashless Payment Systems

Table 5. Payment Timeliness Before Utilization of Cashless Transactions

Indicator	Mean	Descriptive Rating
1. The payment system allows me to pay my water bills on time.	1.38	Strongly Disagree
2. I am less likely to miss my payment deadlines	1.44	Strongly Disagree
3. The convenience of the payment method helps me avoid late payment penalties	1.30	Strongly Disagree
4. I can pay anytime, anywhere, which helps me avoid late payments	1.16	Strongly Disagree
5. My payments are processed instantly, so I don't worry about delays	1.47	Strongly Disagree
Grand Mean	1.35	Strongly Disagree

Table 5 presents the respondents' perceptions of collection efficiency before the utilization of cashless transactions, focusing on usability dimensions of the traditional payment system, along with their mean values and interpretations.

The overall grand mean of 1.35, interpreted as Strongly Disagree, indicates that the traditional payment system was perceived as highly ineffective in ensuring timely payments, likely due to manual processing, limited payment channels, and reliance on physical transactions that caused delays and inconvenience.

The indicator “My payments are processed instantly, so I don't worry about delays” (1.47) shows that respondents strongly disagreed that payments were processed instantly, suggesting delays in verification and posting. “I am less likely to miss my payment deadlines” (1.44) reflects disagreement that the system helped prevent missed payments, likely due to limited accessibility and long processing times. “The payment system allows me to pay my water bills on time” (1.38) indicates that respondents perceived poor support for timely payment due to structural constraints. “The convenience of the payment method helps me avoid late payment penalties” (1.30) suggests that the system was not convenient enough to prevent penalties, while “I can pay anytime, anywhere, which helps me avoid late payments” (1.16) highlights the lack of flexibility in payment time and location.

These findings align with Ali and Khan (2023) and Khando et al. (2022), who noted that traditional systems are prone to inefficiencies and delays due to structural and technical limitations. In contrast, Mezoh and Zhou (2024) and Cruz et al. (2024) emphasized that digital payment systems improve efficiency through faster processing, real-time transactions, and greater accessibility.

In summary, the traditional payment system was perceived as inefficient in supporting timely payments, highlighting the need for more accessible and digital payment solutions.

Table 6. Transaction Processing Speed Before Utilization of Cashless Transactions

Indicator	Mean	Descriptive Rating
1. The system processes my payment quickly.	1.40	Strongly Disagree
2. I do not experience significant delays when making payments	1.40	Strongly Disagree
3. The time it takes to process a payment is acceptable	1.42	Strongly Disagree

4. I am able to complete my payment in a timely manner.	1.43	Strongly Disagree
5. The payment system allows quick payment of my water bills	1.31	Strongly Disagree
Grand Mean	1.39	Strongly Disagree

Table 6 presents the respondents' perceptions of transaction processing speed before the utilization of cashless transactions, as reflected by the computed mean scores and interpretations.

The overall grand mean of 1.39, interpreted as Strongly Disagree, indicates that the traditional payment system was perceived as inefficient in terms of processing speed, with respondents experiencing frequent delays due to manual verification, long queues, and physical cash handling.

The indicator "I am able to complete my payment in a timely manner" (1.43) shows that respondents strongly disagreed that payments were completed promptly, while "the time it takes to process a payment is acceptable" (1.42) reflects dissatisfaction with slow and lengthy procedures. Likewise, "The system processes my payment quickly" (1.40) and "I do not experience significant delays when making payments" (1.40) both indicate that delays were commonly experienced, affecting convenience and satisfaction. The lowest mean, "The payment system allows quick payment of my water bills" (1.31), further emphasizes the lack of efficiency and streamlined processes in the traditional system.

These findings align with Widayani and Fiernaningsih (2022) who highlighted that manual processes and weak infrastructure contribute to slow transaction handling and reduced efficiency. In contrast, Villanueva and Chua (2023) noted that cashless systems significantly improve processing speed by reducing queues, minimizing manual intervention, and streamlining transactions.

In summary, the traditional payment system was perceived as slow and inefficient, reinforcing the need for faster, digital payment solutions to improve transaction processing speed.

Table 7. Payment Timeliness After Utilization of Cashless Transactions

Indicator	Mean	Descriptive Rating
1. The payment system allows me to pay my water bills on time.	3.98	Strongly Agree
2. I am less likely to miss my payment deadlines	3.97	Strongly Agree
3. The convenience of the payment method helps me avoid late payment penalties	3.97	Strongly Agree
4. I can pay anytime, anywhere, which helps me avoid late payments	3.95	Strongly Agree
5. My payments are processed instantly, so I don't worry about delays	3.97	Strongly Agree
Grand Mean	3.97	Strongly Agree

The Table presents the respondents' perceptions of payment timeliness after the utilization of cashless transactions, based on computed mean scores and interpretations.

The overall grand mean of 3.97, interpreted as Strongly Agree, indicates a significant improvement in payment timeliness following the adoption of cashless transactions. This suggests that digital payment systems effectively enhanced concessionaires' ability to meet payment deadlines through improved convenience, accessibility, and real-time processing.

These findings align with Velasco and Yu (2023), who emphasized that digital payment systems improve timeliness by reducing barriers related to time, location, and manual processing, thereby enhancing collection efficiency. However, Hasan et al. (2025) noted that cybersecurity and privacy concerns may still influence user trust and sustained adoption.

In summary, the results indicate that cashless transactions significantly improved payment timeliness, driven by system accessibility, convenience, and instant processing, alongside a generally high level of user confidence.

Table 8. Transaction Processing Speed After Utilization of Cashless Transactions

Indicator	Mean	Descriptive Rating
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1. The system processes my payment quickly.	3.94	Strongly Agree
2. I do not experience significant delays when making payments	3.93	Strongly Agree
3. The time it takes to process a payment is acceptable	3.95	Strongly Agree
4. I am able to complete my payment in a timely manner.	3.95	Strongly Agree
5. The payment system allows quick payment of my water bills	3.96	Strongly Agree
Grand Mean	3.95	Strongly Agree

Table 8 presents the respondents' assessment of transaction processing speed after the utilization of the cashless payment system, focusing on its efficiency, timeliness, and overall improvement in payment processing.

The overall grand mean of 3.95, interpreted as Strongly Agree, indicates that transaction processing speed significantly improved after the implementation of cashless payments. This reflects respondents' strong perception that digital transactions have enhanced efficiency, reduced delays, and streamlined water bill payments.

These findings support Del Rosario (2024), who emphasized that digital payment systems improve processing speed through automation, reduced administrative delays, and faster service delivery. However, Lee et al. (2021) noted that connectivity issues, infrastructure limitations, and system errors may still affect transaction efficiency, particularly in areas with weak digital support.

Overall, the results confirm that cashless transactions have substantially improved transaction processing speed, enhancing both customer convenience and operational efficiency, while highlighting the need for reliable infrastructure to sustain these gains.

Table 9. Difference in Collection Efficiency Before and After Utilization in Terms of Payment Timeliness

Particulars	Mean difference	Standard deviation	T-value	P-value
BPQ1 vs APQ1	-2.59	0.743	-59.56**	0.000
BPQ2 vs APQ2	-2.53	0.743	-58.08**	0.000
BPQ3 vs APQ3	-2.67	0.676	-67.26**	0.000
BPQ4 vs APQ4	-2.78	0.496	-95.72**	0.000
BPQ5 vs APQ5	-2.51	0.794	-53.83**	0.000
Overall	-2.62	0.640	-69.76**	0.000

Table 9 indicates a significant improvement in payment timeliness following the adoption of cashless payment systems. The overall mean difference of -2.62 and a t-value of -69.76, with a p-value below the 0.01 level, confirm the rejection of the null hypothesis and demonstrate a statistically significant difference between pre- and post-utilization periods. This suggests that concessionaires were more likely to settle payments on time after implementation.

Consistent mean differences across all indicators (ranging from -2.51 to -2.78) further highlight a clear shift from low to high ratings, reflecting enhanced efficiency in payment behavior. These improvements are attributed to the convenience, accessibility, and real-time processing features of cashless systems, supporting findings by Rivas (2023), who emphasized the role of digital payments in promoting timely transactions.

However, challenges such as limited digital literacy and inadequate user knowledge remain potential barriers, as noted by Lissah et al. (2024). Overall, while cashless payment systems significantly enhance payment timeliness and collection efficiency, sustaining these gains requires addressing user-related and infrastructural constraints.

Table 10. Difference in Collection Efficiency Before and After Utilization in Terms of Transaction Processing Speed

Particulars	Mean difference	Standard deviation	T-value	P-value
BTQ1 vs ATQ1	-2.54	0.725	-59.78**	0.000

BTQ2 vs ATQ2	-2.54	0.686	-63.09**	0.000
BTQ3 vs ATQ3	-2.53	0.715	-60.39**	0.000
BTQ4 vs ATQ4	-2.52	0.798	-53.85**	0.000
BTQ5 vs ATQ5	-2.65	0.659	-68.67**	0.000
Overall	-2.56	0.659	-66.13**	0.000

Table 10 demonstrates a highly significant improvement in transaction processing speed following the adoption of cashless payment systems, as evidenced by a mean difference of -2.56, a t-value of -66.13, and a p-value of 0.000. These results indicate both statistical and practical significance, confirming that digital payment systems substantially enhanced processing efficiency. The low and consistent standard deviations further suggest that these improvements were uniformly experienced across respondents.

The consistent mean differences across indicators imply that enhancements occurred throughout the entire transaction process, reflecting streamlined workflows, reduced manual intervention, and minimized delays. This highlights the effectiveness of cashless systems in delivering faster, more reliable, and standardized transaction procedures.

These findings align with prior studies from Calderon (2024) and reports from the Bangko Sentral ng Pilipinas (2023), which emphasize the role of digital payments in accelerating transaction processing and improving service efficiency. Despite potential infrastructure-related challenges, the results confirm that cashless payment systems significantly enhance transaction speed, thereby improving overall collection efficiency and operational performance.

3.4 Difference of Level of Efficiency of Cashless Transactions When Grouped According to the Demographic Profile

Table 11. Difference in Level of Efficiency of Cashless Transactions When Grouped by Age

Particular	Mean					F-Test	P Value
	20-29	30-39	40-49	50-59	60 and above		
1. Functionality	3.73	3.8	3.78	3.84	4	0.920ns	0.450
2. Usability	3.86	3.92	3.89	3.94	4	0.640ns	0.642
3. Reliability	3.8	3.87	3.87	3.88	4	0.780ns	0.538

Table 11 examines whether perceptions of cashless transaction efficiency differ across age groups, focusing on functionality, usability, and reliability. The analysis presents the mean scores and standard deviations for each age group, providing a basis for comparing how respondents evaluate the system's efficiency.

Additionally, the F-test and corresponding p-values determine whether any observed differences are statistically significant. This approach allows the study to assess whether age-related factors influence users' perceptions and overall evaluation of the cashless payment system.

The results indicate that respondents across all age groups perceive cashless transactions as highly efficient in terms of functionality, usability, and reliability, as reflected in consistently high mean scores. Statistical analysis using the F-test shows no significant differences across age groups, indicating that age does not influence perceptions of system efficiency.

This uniformity suggests that the cashless transaction system is broadly acceptable and user-friendly, effectively addressing the needs of both younger and older users while minimizing age-related barriers. Consequently, initiatives aimed at improving payment collection through cashless systems can be implemented with confidence that they will be well-received across diverse age groups.

Overall, the findings support the conclusion that cashless transactions are an inclusive and effective approach to enhancing payment collection efficiency, with consistent positive evaluations across all age demographics.

Table 12. Difference in Level of Efficiency of Cashless Transactions When Grouped by Sex

Particulars	Mean		F-test	P Value
	Male	Female		
1. Functionality	3.78	3.78	0.000ns	0.978
2. Usability	3.88	3.91	0.760ns	0.383
3. Reliability	3.83	3.87	1.290ns	0.257

The table analyzes perceived efficiency of the cashless payment system when respondents are grouped by sex, focusing on functionality, usability, and reliability. Results show that both male and female respondents rate the system as highly efficient across all dimensions, with usability receiving the highest ratings, followed by reliability and functionality. The similarity in mean scores indicates a consistent and favorable perception between groups.

F-test results and corresponding p-values reveal no statistically significant differences between male and female respondents across all dimensions, indicating that sex does not influence perceptions of system efficiency.

Overall, the findings suggest that the cashless payment system is inclusive, user-friendly, and gender-neutral, effectively meeting the needs of all users and promoting consistent satisfaction and confidence in its use.

Table 13. Difference in Level of Efficiency of Cashless Transactions When Grouped by Educational Attainment

Particular	Mean				F-Test	P Value
	Elementary	High School	Vocational	College		
1. Functionality	3.75	3.73	3.84	3.81	1.420ns	0.238
2. Usability	3.98	3.87	4	3.9	0.990ns	0.400
3. Reliability	3.87	3.83	3.92	3.87	0.570ns	0.633

The table analyzes the perceived efficiency of cashless transactions across different educational attainment levels—elementary, high school, vocational, and college—focusing on functionality, usability, and reliability. Results show that respondents from all educational backgrounds consistently rate the system as highly efficient across all dimensions.

The findings indicate that educational attainment does not significantly influence users' perceptions, suggesting that the cashless payment system is broadly accessible and user-friendly. Its design effectively accommodates varying levels of knowledge and experience, minimizing barriers to adoption.

Overall, the results highlight that the system promotes confidence, satisfaction, and consistent engagement among users regardless of educational background, supporting its effectiveness as an inclusive and reliable payment solution.

Table 14. Difference in Level of Efficiency of Cashless Transactions When Grouped by Household Income

Particular	Mean				F-Test	P Value
	Less than 10,000	10,001-25,000	25,001-50,000	50,000 and above		
1. Functionality	3.78	3.75	3.81	3.82	0.640ns	0.590
2. Usability	3.91	3.89	3.9	3.87	0.110ns	0.954
3. Reliability	3.85	3.85	3.87	3.82	0.100ns	0.958

The results indicate that respondents across all income levels perceive cashless transactions as highly efficient in terms of functionality, usability, and reliability, as reflected in consistently high mean scores. Statistical analysis using the F-test shows no significant differences across income groups, indicating that household income does not influence perceptions of system efficiency.

This uniformity suggests that the cashless transaction system is broadly accessible and user-friendly, effectively meeting the needs of users across different economic backgrounds while minimizing income-related barriers. Consequently, initiatives to improve payment collection through cashless systems can be implemented with confidence that they will be well-received across diverse income groups.

Overall, the findings support the conclusion that cashless transactions are an inclusive and effective approach to enhancing payment collection efficiency and service delivery, with consistent positive evaluations across all income levels.

Table 15. Difference in Level of Efficiency of Cashless Transactions When Grouped by Years of Using LWD Service

Particular	Mean				F-Test	P Value
	Less than 1 year	1 to 2 years	3 to 5 years	More than 5 years		
1. Functionality	3.81	3.74	3.76	3.84	1.880ns	0.134
2. Usability	3.92	3.89	3.87	3.93	0.780ns	0.506
3. Reliability	3.89	3.83	3.83	3.92	1.640ns	0.179

Table 15 examines whether the perceived efficiency of cashless transactions varies according to respondents' length of experience with the local water district (LWD) service. The analysis shows that users across all experience levels—ranging from less than one year to more than five years—consistently rate the system as highly efficient in terms of functionality, usability, and reliability.

The results further indicate no significant differences in perceptions across groups, suggesting that the duration of service usage does not influence how users evaluate the system's performance. This consistency implies that the cashless payment system is accessible and user-friendly, effectively accommodating both new and long-term users.

Overall, the findings highlight that the system fosters confidence and satisfaction regardless of user experience, supporting its effectiveness as an inclusive and reliable approach to enhancing payment efficiency and sustained user engagement.

3.5 Challenges of water district concessionaires

Table 16. Challenges Water District Concessionaires Face in Utilizing Cashless Transactions

Challenges	Mean Rating	Rank
Statement of Account errors	8.79	10
Extra transaction charges are being imposed on users	5.01	4
The need for internet access in conducting some cashless transactions brings additional cost and inconvenience to users	4.02	3
Transaction procedures complicate cashless transactions	7.49	9
Lack of sufficient knowledge to cashless payments	1.87	1
Older generations struggle with unfamiliar technology	6.66	7
Poor and inaccessible internet connectivity	5.79	5
Lack of awareness and education to cashless systems	2.28	2
Lack of enthusiasm among LWDs in adopting cashless payment system	6.73	8
Consumers are still wary of technology / unwilling to adopt change	6.36	6

Table 16 identifies the key challenges faced by concessionaires in utilizing cashless transaction systems in Local Water Districts (LWDs), based on mean ratings and rank order. The most significant barriers are lack of sufficient knowledge and limited awareness of cashless payment systems, indicating that digital literacy and user education remain the primary constraints to adoption.

Moderate challenges include the need for internet access, additional transaction costs, and poor connectivity, highlighting the role of infrastructure and financial considerations in influencing usage. Behavioral factors, such as resistance to change and difficulties among older users, also contribute to lower adoption, while institutional

factors—such as limited support from LWDs—further affect implementation. Procedural complexity and statement of account errors were identified as less significant concerns.

These findings are supported by literature emphasizing that digital literacy is a key determinant of technology adoption. Fernandez (2024) notes that limited user knowledge of basic functions such as account setup and transaction confirmation reduces actual usage, as users tend to rely on familiar manual payment methods. Likewise, Yang et al. (2021) emphasize that infrastructural limitations, such as unstable internet connectivity and additional transaction costs, further hinder adoption in developing contexts where users are more sensitive to both access and affordability issues.

Overall, the results suggest that improving user education, strengthening infrastructure, and enhancing institutional support are critical to increasing adoption rates, thereby improving payment timeliness, transaction efficiency, and overall collection performance in LWDs.

3.6 Proposed Strategies to Improve the Adoption and Effectiveness of the Cashless Payment Systems

The Cashless Payment Enhancement Program (CPEP) was developed based on findings showing that while cashless transactions significantly improve payment timeliness and transaction efficiency, their adoption is limited by insufficient knowledge and low awareness among concessionaires. The program aims to strengthen digital literacy, improve awareness, and sustain the efficiency gains of cashless systems in Local Water Districts in Isabela.

CPEP seeks to enhance payment collection efficiency by increasing adoption and effective use of cashless transactions. Its specific objectives include improving digital literacy, strengthening system usability and reliability, increasing user trust, promoting wider adoption across all groups, and sustaining improvements in payment timeliness and transaction speed.

The program consists of digital literacy training, awareness campaigns, system improvements, and incentive mechanisms supported by partnerships with financial institutions and technology providers. These interventions include hands-on workshops, information drives, system upgrades, helpdesk support, and promotional incentives to encourage consistent use of cashless payments.

Implementation will follow a phased approach involving planning, training, system enhancement, incentive rollout, and continuous monitoring. Key responsible units include IT and management for system development, customer service for training and outreach, finance for incentives, and external partners such as banks and e-wallet providers for payment integration.

Overall, CPEP is expected to increase adoption of cashless payments, improve payment timeliness and transaction speed, and enhance user satisfaction. Through continuous monitoring and stakeholder collaboration, the program supports a more efficient, reliable, and inclusive payment system in Local Water Districts.

IV. CONCLUSION

This study establishes that the implementation of cashless transactions significantly improves the payment collection efficiency of Local Water Districts in Isabela, particularly in terms of functionality, usability, reliability, payment timeliness, and transaction processing speed. The system is generally perceived as highly efficient, user-friendly, and dependable, resulting in faster, more convenient, and more reliable payment processes following its adoption. Furthermore, the absence of significant differences across demographic profiles indicates that cashless payment systems are broadly acceptable and applicable to diverse user groups.

In terms of advantages, cashless transactions offer enhanced operational efficiency, reduced processing delays, and improved convenience in payment collection systems. Nevertheless, the study also identifies key limitations, including inadequate digital literacy, limited awareness, infrastructural constraints such as internet connectivity, and behavioral resistance to technological adoption, which may impede full utilization of the system.

The findings have important practical implications for Local Water Districts and similar public service institutions pursuing digital transformation. The results support the expansion and institutionalization of cashless payment systems as a mechanism for improving revenue collection efficiency. To maximize its benefits, efforts should be directed toward strengthening user education, improving technological infrastructure, and enhancing

institutional support. Future research may further examine long-term adoption patterns and explore advanced digital payment innovations to sustain and enhance system performance.

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