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REVIEW OF LITERATURE

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STATEMENT OF THE PROBLEM

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HYPOTHESIS (ES)

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

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RECOMMENDATIONS/SUGGESTIONS

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REFERENCES

APPENDIX/ANNEXURE

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- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
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AN ANALYSIS OF THE EFFECTS OF MOBILE MONEY TRANSFER (MMT) ON WATER BILL DEFAULT RATIO: A CASE OF NAKURU WATER AND SANITATION SERVICES COMPANY (NAWASSCO)

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ABSTRACT

The study sought to analyze the effect of mobile money transfers (MMT) on default ratio using the case of M-pesa (Mobile Pesa- Swahili word for Money) at NAWASSCO. This study was a case study which targeted 24,724 household clients of NAWASSCO. The study period was four years (July 2007 –December 2011). The objectives were; to determine the usage of M-pesa payments at NAWASSCO and to analyze the effect and relationship of M-pesa usage on default at NAWASSCO. Using a data capture sheet, secondary data was collected on the volume of bills issued and paid monthly within the period from Finance Department. Data was divided into two samples representing two time periods i.e. from July 2007 to June 2009 (pre-Mpesa) and January 2010 to December 2011 (post-Mpesa). Line graphs showed that M-pesa usage picked an upward trend throughout the study period. Debtor collection periods reduced during post M-pesa period. A test of significance gave a P value of 0.000 which was less than the set significance level of 0.05. Null hypothesis was rejected. Therefore there was significant difference in default ratio between the two periods attributable to water bill payment via M-pesa. The correlation coefficient was -0.031 which implied a weak negative relationship i.e. an increase in M-pesa payment ratio led to a decrease in default ratio. Coefficient of determination (R2) of 0.56 (56%) implied that M-pesa usage for bill payment had 56% influence on reduced default ratio at NAWASSCO. The remaining 44% may be attributed to other components of working capital i.e. inventory and accounts payable.

KEYWORDS

mobile banking, person-to-person (P2P) transfers, unbanked, under-banked, working capital.

JEL CODE

MOO

1.0 INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Effective management of accounts receivable presents important opportunities for organizations to achieve strategic advantage through improvements in customer service, cash management and reductions in costs. All organizations also have an objective of continually improving customer service. A large number of businesses are required to operate under a full or partial cost recovery arrangement. Effective accounts receivable management can assist organizations improve customer service through providing timely information on customer requirements and by making dealing with the organization as easy as possible. The primary objective of accounts receivable in commercial organizations is to collect monies due and to assist in meeting cash flow requirements. An effective accounts receivable function can assist in achieving the desired cash flow outcome through the timely collection of outstanding debts (Celent, 2007).

Financial management functions such as accounts receivable have been traditionally viewed as transaction processing activities. Elimination or reduction of non-value tasks can be affected through better work practices and automation of processes. This can be achieved by analyzing current processes and redesigning them to remove as much manual intervention as possible, reducing rekeying and appraisal activities and minimizing operator error. An important part of this analysis is a formal, structured risk assessment which identifies and measures exposures associated with the accounts receivable process. Significant advances in accounts receivable performance and process efficiency are available to agencies through the following five complementary key management initiatives: Re-engineering accounts receivable, risk assessment, use of advanced technology, debt collection processes, and performance measurement. Technologies used include mobile money transfer in bill payment.

The objective of financial management is to maximize the shareholders wealth. So it is needed to generate sufficient profits. The profits generated depend mainly on sales volume. When the goods are being sold on credit as is the normal practice of business firms today to cope with increased competition, the sale of goods cannot be converted into cash instantly because of time lag between sales and realization of cash. As there is a time lag between sales and realization of receivables there is a need for sufficient working capital to deal with the problem which arises due to lack of immediate realization of cash against goods sold. The operating cycle is the length of time required for conversion of non-cash assets into cash. This operating cycle refers to the time taken for the conversion of cash into raw material, raw materials into work-in-progress, work-in-progress into finished goods, finished into receivables into cash and this cycle repeats. The operating cycle length differs from firm to firm. If a firm has lengthy production process or a firm has liberal credit policy the length of operating cycle will be more. On the other hand, if a firm does not extent credit or the firm is not a manufacturing concern i.e. where cash will be converted into inventory directly then the length of operating cycle will be reduced to a greater extent. The length of operating cycle can be calculated by calculating periods of raw material storage, work in process, finished gods storage and debtors collection period. Debtor Collection Period indicates the average time taken to collect trade debts. In other words, a reducing period of time is an indicator of increasing efficiency. It enables the enterprise to compare the real collection period with the granted/theoretical credit period. Debtor Collection Period indicates the average time taken to collect trade debts i.e. reducing period of time is an indicator of increasing efficiency. It enables the enterprise to compare the real collection period with the granted or theoretical credit period.

Bill payments via MMT have been implemented by a number of deployments in the world, including Thailand's True Money, Pakistan's Easy Paisa, and Ghana's MTN Mobile Money. Safaricom M-pesa is not being left behind the pack because it has already partnered with several organizations in the country to provide effective and efficient bill payment services. One of these organizations is NAWASSCO. The water company has been encouraging its customers to use M-pesa to clear the water bills since the year 2009

1.2 STATEMENT OF THE PROBLEM

For smooth running an enterprise, adequate amount of working capital is very essential. Efficiency helps to utilize fixed assets gainfully, to assure the firm's long-term success and to achieve the overall goal of maximization of the shareholders' funds. This creates an imperative to ensure the management of receivables is both efficient and effective. Developments in technology have permitted alternative functionalities for mobile handsets beyond the original communication function. Among these functions is Mobile Money Transfer. Mobile money is a key driver in the innovative landscape of management of accounts receivables by creating a platform for utility bill payment. High transaction costs incurred by customers through transport to payment points and burdensome paper-based billing processes for water service providers are key obstacles to efficient and secure revenue collection. Efficient revenue collection is one of several measures required to improve the operational performance of urban water utilities to achieve more sustainable and equitable approaches to serving the urban dwellers (Water Services Board, 2011). With the advent of mobile money transfers as a mode of paying bills, most organizations have welcomed and embraced the new innovation and the water boards are no exception. The study sought to analyze the effect of mobile money transfers on default ratio using the case of M-pesa at NAWASSCO. Most of these studies were conducted in developed countries and major cities thus may not reflect the impact on the success or failure of different business environments and in particular the MMT in a developing country like Kenya. The study aims at filling this information gap.

1.3 GENERAL OBJECTIVE OF THE STUDY

The main objective of the study was establishing the effect of mobile money transfer financial service on default using the case of M-pesa and NAWASSCO.

1.4 SPECIFIC OBJECTIVES OF THE STUDY

Specifically the study sought to address the following objectives;

i. To determine the usage of M-pesa for payment water bills at NAWASSCO
ii. To determine the effect of M-pesa usage for water bills payment on default ratio at NAWASSCO.
iii. To determine the relationship between M-pesa payment ratio and default ratio

1.5 HYPOTHESES OF THE STUDY

i. H0: The difference between default ratio in pre and post M-pesa period is not significant
ii. H0:The relationship between M-pesa payment ratio and default ratio is not significant

1.6 SIGNIFICANCE OF STUDY

For policy makers and water boards, this study acts as an assessment of the various initiatives undertaken to help manage accounts receivable. This study gives NAWASSCO and other commercial organizations insight by providing an empirical study on how technology can help in the management of accounts receivable. MNOs (Mobile Network Operators) can be able to make an assessment of the sustainability of bill payment through MMT in relation to the substitutes that already exist in the market. The study will also contribute literature to the field of MMT and default in water bills that can be used by other scholars.

1.7 SCOPE OF THE STUDY

The study focused on establishing the effect of mobile money transfers on default ratio using a case of M-pesa at NAWASSCO. Only household clients use M-pesa for bill payment thus the focus. Safaricom's M-pesa mobile payment provider is the only one used at NAWASSCO. The study involved collecting secondary data from July 2007 to December 2011.

1.8 LIMITATIONS OF THE STUDY

The use of 24,724 domestic clients may have some limitations since it only captures the most active clients. However, this may not have a serious draw back as it gives a good representation of the domestic clients

The other limitation may arise from the specific statistical tests used in the study. For instance, the use of independent t test is unable to give exact effect of M-pesa on default rate. However, this doesn't invalidate its use in the study as correlation and regression analyses were further conducted.

2.0 RESEARCH METHODOLOGY

2.1 RESEARCH DESIGN

The study adopted a case study research design since it narrowed down intensively on the analysis of one individual researchable topic from a very broad field of research. This design was also suitable in describing usage of M-pesa payments and comparing default in the two periods of the study.

2.2 TARGET POPULATION OF THE STUDY

The target population was NAWASSCO's domestic clients who were 24,724. The study entirely focused on the domestic clients only. Corporate clients were not captured since they are not allowed to pay via M-pesa due to high amounts of their bills.

3.0 DATA AND DATA COLLECTION PROCEDURES

The researcher used a data capture sheets to collect secondary data for a period of four years (July 2007–December 2011). The researcher extracted the data from NAWASSCO's finance offices. Secondary data collected included the quantity of bills issued and paid monthly within the period. Data was divided into two samples representing two time periods i.e. from July 2007 to June 2009 and January 2010 to December 2011. The periods correspond to pre-M-pesa period and post-M-pesa period respectively. Data between July 2009 and December 2009 was not be used since it was the transition period around when NAWASSCO had rolled out the M-pesa bill payment system.

3.1 RELIABILITY AND VALIDITY OF THE INSTRUMENTS

Content validity of the research instrument was established in order to make sure that they reflected the content of the study concepts. The researcher scrutinized the instrument and compared its content with the set objectives to ensure that it contained all the information that addressed the study objectives. The instrument was then piloted at NAWASSCO before the main study to test its reliability. Piloting was essential to eliminate ambiguity in items, test data collection instructions, establish the feasibility of the study, anticipate and amend any logical and procedural difficulties regarding the study, and allow preliminary (dummy) data analysis (Kombo & Tromp, 2006).

3.2: DATA ANALYSIS AND PRESENTATION

Data collected was sorted and summed up to get the monthly totals. Default ratio, payment ratio, M-pesa payment ratio and debt collection period were calculated. Descriptive statistics were used to show usage of M-pesa at NAWASSCO. These included ratios and line graphs. Inferential statistics i.e. independent t test, correlation and regression analyses were used in testing hypotheses of the study.

4.0 RESULTS AND DISCUSSION

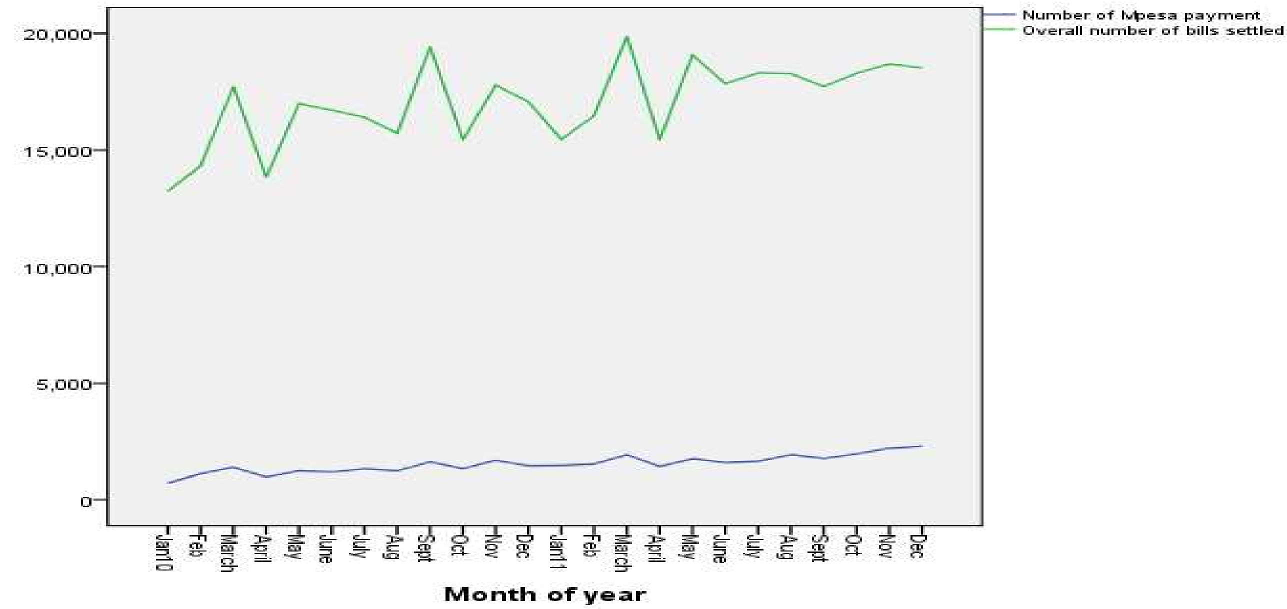
4.1 ANALYSIS OF THE USAGE OF M-PESA PAYMENTS AT NAWASSCO

Line graphs were used to plot M-pesa payments against overall payments, number of M-pesa payments against number of cash payments, M-pesa amounts to overall amounts of the bills, M-pesa amounts to cash payments of the bills, number of M-pesa payments to number of bills due.

4.1.1 COMPARISON OF NUMBER OF M-PESA PAYMENTS TO OVERALL PAYMENTS

From the graph below, the number of M-pesa payments increased steadily from January 2010 to December 2011 with lowest number in January 2010 and highest in December 2011 since it was still in infancy and thus less popular. Generally, the number of bills settled increased with the increasing number of bills issued during the study period. The numbers of bills settled were at the lowest in December 2007 after which the number of bills settled generally increased reaching the peaks during July 2008, March 2010, September 2010 and April 2011.Generally, the number of bills settled increased with the increasing number of M-pesa payments during the study period as depicted in Graph 4.1.

GRAPH 4.1: A COMPARISON OF NUMBER OF M-PESA PAYMENTS TO OVERALL PAYMENTS

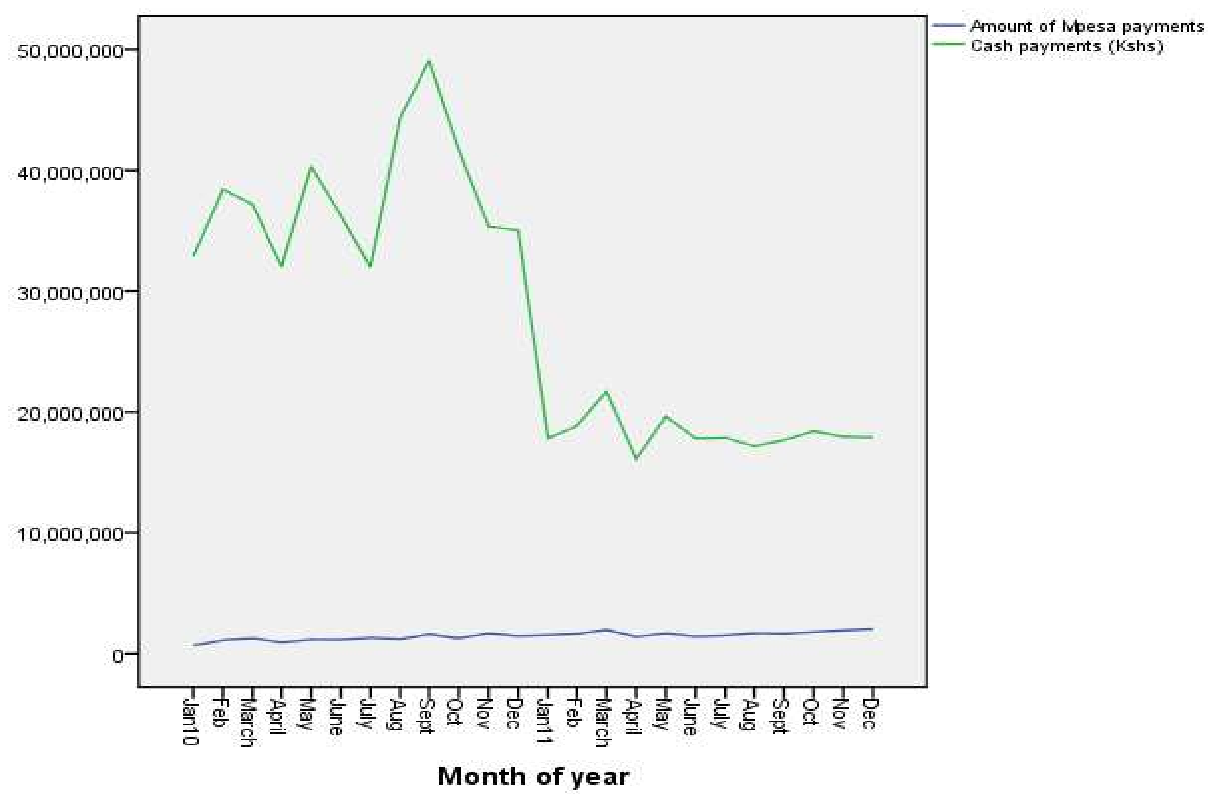


Source: Author 2013

4.1.2 COMPARISON OF M-PESA AMOUNTS TO CASH PAYMENTS OF THE BILLS

From Graph 4.2 below, cash amounts of bills (Kshs) settled fluctuated during the period reaching highest in September 2010, its lowest in April 2011 while remaining fairly constant from May 2011 to December 2011.Generally, the number of bills settled increased with the increasing number of M-pesa payments during the study period. The number of M-pesa payments increased steadily from January 2010 to December 2011 with lowest number in January 2010 and highest in December 2011. It may be observed that compared to cash amount of bills (Kshs) settled, the number of M-pesa payments were relatively small though increased steadily during the study period.

GRAPH 4.2: A COMPARISON OF M-PESA AMOUNTS TO CASH PAYMENTS OF THE BILLS

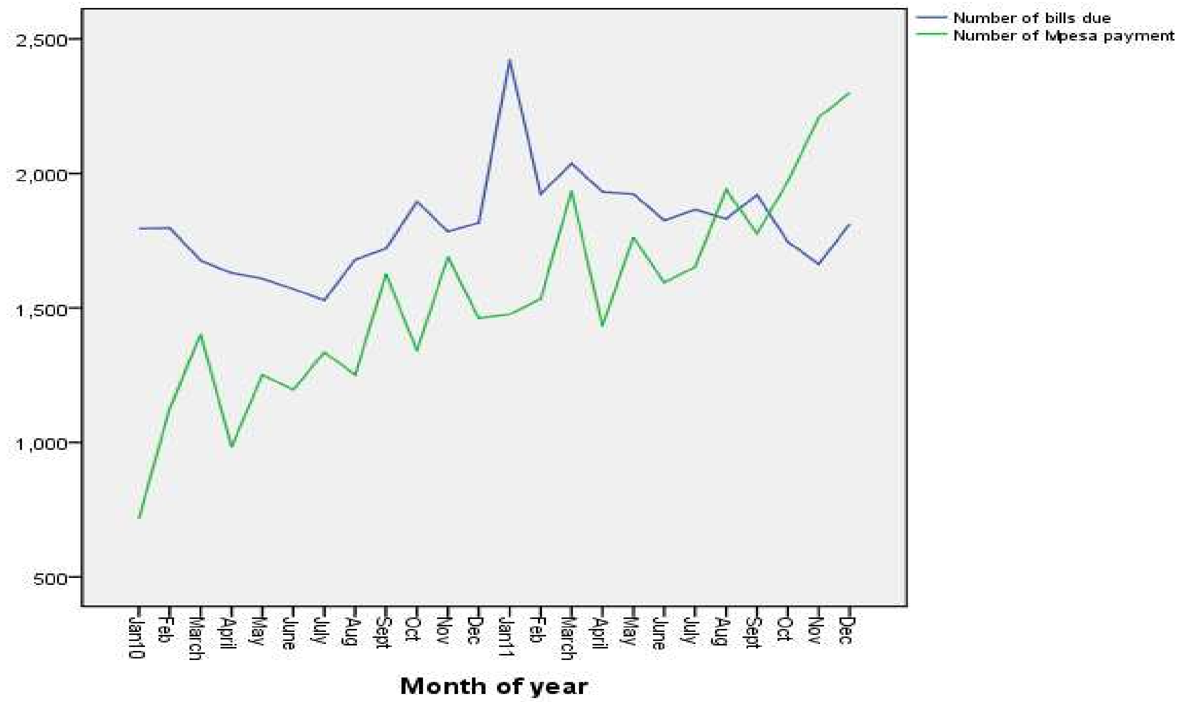


Source: Author 2013

4.1.3 COMPARISON OF NUMBER OF M-PESA PAYMENTS TO NUMBER OF BILLS DUE

From the graph below, the number of bills due fluctuated during the period reaching lowest in July 2010 and peaked in February2011 while reduced gradually between March 2011 and November 2011. It is noticeable that the number of M-pesa payments increased steadily from January 2010 to December 2011 with lowest number in January 2010 and highest in December 2011. It may be observed that the periods that witnessed higher M-pesa payments generally coincided with reduced number of bills due such as March 2010, March 2011, September 2011 and November 2011. The intersections of the two curves explain that M-pesa exceeded bills due at those points and vice versa.

GRAPH 4.3: A COMPARISON OF NUMBER OF M-PESA PAYMENTS TO NUMBER OF BILLS DUE



Source: Author 2013

4.2 EFFECT OF M-PESA USAGE ON DEFAULT RATIO AT NAWASSCO

Debtor collection period was calculated yearly for both pre and post M-pesa periods. Default ratio in pre and post M-pesa periods was compared to each other using independent t test**.** This was followed by the testing of the relationship between M-pesa payments and default ratio using correlation and regression models.

4.2.1 DEBTOR COLLECTION PERIOD AT NAWASSCO

This was calculated using the formulae; Debtor Collection Period = (Average Debtors / Credit Sales) x 365. This was calculated yearly during the two sub periods of the study.

For Pre M-pesa period, debtor collection period was calculated as follows;

Year 1 (From July 2007 to June 2008);

Debtor Collection Period= 81,318,352/290,779,810*365= 102.07 days (approximately 102 days)

Year 2 (From July 2008 to June 2009);

Debtor Collection Period= 60,996,740/266,943,008*365= 83.4 days (approximately 83 days)

For post M-pesa period, debtor collection period was calculated the same as in pre M-pesa;

Year 1 Debtor Collection Period= 19,184,834/134,309,702*365= 52.1 days (approximately 52 days)

Year 2 Debtor Collection Period= 26,114,906/214,482,220*365= 44.44 days (approximately 44 days)

From the calculations above, debtor collection period was 102 and 83 days in year one and year two respectively during pre M-pesa period. Debtor collection period was 52 and 44 days in year one and year two respectively during post M-pesa period. Debt collection was slower in pre M-pesa period as compared to a faster debtor collection in post M-pesa. A long debtor's collection period is an indication of slow or late payments by debtors. This is attributed to measures that NAWASSCO took and the most prominent being bill payment through M-pesa. Debtor Collection Period enables the enterprise to compare the real collection period with the granted or theoretical credit period. Credit period at NAWASSCO is 14 days. Debtor collection period was 52 and 44 days in year one and year two respectively during post M-pesa period. Clearly this is reducing towards the 14 days credit period at NAWASSCO. This is attributed to M-pesa bill payments.

4.2.2 COMPARISON OF DEFAULT IN PRE M-PESA PERIOD TO DEFAULT IN POST M-PESA PERIOD

(H_{01}) hypothesis one states there is no significant difference in default during the pre M-pesa period and Post M-pesa period. The hypothesis was tested using independent sample t-test. This was based on the assumptions that the two periods (pre-M-pesa and Post-M-pesa) represent two independent samples and that data was normally distributed.

From the table below, the mean of default for pre-M-pesa period (M = 14.6957) is greater than the post M-pesa period (M=7.5975). This implies that default ratio was much lower in the post M-pesa period as compared to pre M-pesa period.

TABLE 4.1: INDEPENDENT SAMPLE T-TEST OUTPUT FOR COMPARISON OF DEFAULT RATIOS

	Group	N	Mean	Std. Deviation	Std. Error Mean
Default	Pre-M-pesa Period	24	14.6957	3.90275	.79665
	Post-M-pesa Period	24	7.5975	.86168	.17589

Source: Author 2013

From the table below, the level of significance indicates that the observed difference in default during the pre-M-pesa period and post-M-pesa period is statistically significant since P value of 0.000 is less than significance level of 0.05. Therefore decision rule is to reject null hypothesis; therefore there is significant difference in default ratio between the two periods attributable to M-pesa payment.

TABLE 4.2: INDEPENDENT SAMPLES TEST RESULTS FOR COMPARISON OF DEFAULT RATIOS

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Default Ratio	Equal variances assumed	35.526	.000	8.701	46	.000	7.09816	.81583	5.45598	8.74035
	Equal variances not assumed			8.701	25.237	.000	7.09816	.81583	5.41872	8.77760

Source: Author 2013

4.3 RELATIONSHIP BETWEEN M-PESA PAYMENTS AND DEFAULT RATIO

H_{02}: There is no significant relationship between M-pesa payments and default ratio. Correlation and regression analyses were conducted separately to test this hypothesis.

A two-tailed correlation analysis was conducted at 5% level of significance. A two tailed analysis was chosen because the study tested the possibility of the relationship in both directions i.e. study is looking for either an increase or a decrease.

From the table below, it is observed that relationship (r=-0.031) is a weak negative relationship. This implies that an increase in M-pesa payments leads to a decrease in default ratio and a decrease in M-pesa payments leads to an increase in default ratio.

Calculated P-value of 0.885 is greater than significance level of 0.05 thus accept H_{02} which states that there is no significant relationship between M-pesa payments and default ratio during post M-pesa period i.e. relationship is not statistically significant.

TABLE 4.3: CORRELATION ANALYSIS FOR RELATIONSHIP BETWEEN M-PESA PAYMENTS AND DEFAULT RATIO

Correlations			
		Number of M-pesa payment	Disconnection Ratio
Number of M-pesa payment	Pearson Correlation (r)	1	-.031
	Sig. (2-tailed)		.885
	N	24	24
Default Ratio	Pearson Correlation (r)	-.031	1
	Sig. (2-tailed)	.885	
	N	24	24

Source: Author 2013

Regression analysis was done to calculate the relationship by computing the amount of influence the independent variable had on the dependent variable at 5% significance level.

From the tables below, coefficient of determination (R^2) is 0.560 (56.0%). P value of 0 .000 is less than significance level of 0.05 so reject H_0; therefore the relationship between M-pesa payments and default ratio is statistically significant. It is hereby concluded that M-pesa payments influence default ratio by 56.0%. The remaining 44% influence is attributed to other components of working capital i.e. cash and inventory.

TABLE 4.4: RELATIONSHIP BETWEEN M-PESA PAYMENTS AND DEFAULT RATIO

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.749[a]	.560	.551	3.04819	.560	58.613	1	46	.000

Source: Author 2013

The reason for the difference in P values of correlation and regression analysis is because the two methods are technically different from each other. Correlation computes the value of the Carl Pearson correlation coefficient (r) while regression quantifies goodness of fit with Coefficient of Determination (R^2).

5.0 CONCLUSIONS AND RECOMENDATIONS

5.1 SUMMARY OF THE FINDINGS

NAWASSCO initiated M-pesa in June 2009. The objective of this initiative was to improve revenue collection through increasing payment ratio and reducing default in water bills, making payment convenient to customers, and intention of 'going green' by reducing massive paperwork involved in processing over the counter transactions. This study sought to establish the effect of M-pesa usage on default ratio.

First, line graphs were sketched to show the usage of M-pesa water bill payments at NAWASSCO. This analysis showed that M-pesa picked a steady upward usage throughout the study period. This means that bill payment through M-pesa increased over the entire period.

Secondly, debtor collection period was calculated for both pre M-pesa period and post M-pesa period. Debtor collection period was 102 and 83 days in year one and year two respectively during pre M-pesa period. Debtor collection period was 52 and 44 days in year one and year two respectively during post M-pesa period. Debt collection was slower in pre M-pesa period as compared to a faster debtor collection in post M-pesa. A long debtor's collection period is an indication of slow or late payments by debtors. This is attributed to measures that NAWASSCO took and the most prominent being bill payment through M-pesa. Debtor Collection Period enables the enterprise to compare the real collection period with the granted or theoretical credit period. Credit period at NAWASSCO is 14 days. Debtor collection period was 52 and 44 days in year one and year two respectively during post M-pesa period. This is reducing towards the 14 days credit period. This is attributed to M-pesa bill payments.

A test of significance was carried out to test whether the introduction of M-pesa had an effect on the default ratio. This was done using independent t test. The level of significance indicates that the observed difference in default during the pre-M-pesa period and post-M-pesa period is statistically significant since P value of 0.000 is less than significance level of 0.05. Therefore decision rule was to reject null hypothesis; therefore there was significant difference in default ratio between the two periods attributable to water bill payment via M-pesa.

Thirdly, correlation and regression analyses were conducted to describe the relationship between MMT usage and default ratio. The correlation coefficient was -0.031 which implied a weak negative relationship. Therefore an increase in M-pesa payment ratio led to a decrease in default ratio. Coefficient of determination (R^2) of 0.56 (56%) implied that M-pesa usage for bill payment had 56% influence on reduced default ratio at NAWASSCO. The remaining 44% is attributed to other components of working capital i.e. inventory and accounts payable.

5.2 CONCLUSIONS

The study sought to determine the effect of M-pesa on payment default of water bills at NAWASSCO. From the results of a time series analysis, M-pesa payment picked an upward usage over the period. An independent t test result showed there was sufficient evidence to conclude that default in the pre M-pesa period is greater than default in the post M-pesa period. In general, the results reveal that the introduction of M-pesa at NAWASSCO has reduced default ratio of water bills; M-pesa has reduced default ratio by 56%. This is beyond 50% mark after only two years in use. These results echo the findings by Hope et al, (2011). According to their study, effect of MMT on bill payment is usually low in the first two to three years of operation due to barriers like alternative pay points, delayed reconciliation, limited awareness, physical proof of payment and high transaction tariffs.

Mobile water payment systems present a promising tool that can meet the needs of water users, WSPs and MNOs. This revenue collection mechanism can also assist WSPs in their efforts to achieve their twin goals of financial and operational sustainability. At the same time, MNOs can further their commercial objectives by driving revenues and retaining subscribers through proper management of debt and reduced water meter disconnections respectively. Work is now needed to improve the uptake of M-pesa water bill payment at NAWASSCO.

5.3 RECOMMENDATIONS

Usage analysis showed M-pesa picked a steady upward usage throughout the study period. This means that bill payment through M-pesa increased over the entire period. More awareness through intensive marketing campaigns could make M-pesa more popular and thus drive the usage higher.

Debt collection was slower in pre M-pesa period as compared to a faster debtor collection in post M-pesa. There was significant difference in default ratio between the pre and post M-pesa periods. Stringent credit policy should be adopted to reduce debtor collection period. For example reduction of 14 day grace period could lower debtor collection period at NAWASSCO.

An increase in M-pesa payment ratio led to a decrease in default ratio. M-pesa usage for bill payment influenced default ratio by 56% at NAWASSCO. Other mobile money transfer systems apart from M-pesa could be made available for clients at NAWASSCO.

5.4 POSSIBLE AREAS FOR FURTHER RESEARCH

This research only evaluated the effect of M-pesa on default. In future studies can be done on effect of M-pesa on default at NAWASSCO or other service providers using longer comparison periods e.g. data on 5 years pre M-pesa and 5 years post M-pesa as opposed to the 2 years apiece used in this study.

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