



The Influence of Working Capital Management on the Profitability of Listed Manufacturing Companies in Tanzania

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Abstract

Working capital management (WCM) and listed manufacturing companies (LMCs) profitability are subjects that have taken much attention of scholars globally because cash management, inventory management, receivables, and payables management components are vital elements for the performance of businesses. However, there is limited literature on the subject that considered the DuPont analysis as a measure of LMCs' profitability as well as that used the finite distributed lag model to analyze WCM variables and profitability. Likewise, there is patchy recorded literature so far that tried to use administration expenses and marketing expenses to moderate the relationship between WCM and LMCs' profitability. To bridge this knowledge gap, this study investigated the influence of WCM on profitability of LMCs' on the Dar es Salaam Stock Exchange Plc (DSE), Tanzania. The study used an explanatory research design based on objectivism philosophies whereby profitability data were collected from the financial reports of the listed manufacturing companies on DSE. Panel data with the Finite Distribution Lag Model was used to analyze the published audited financial reports for 14 years, from 2005 to 2018 inclusive, of listed manufacturing firms. The results showed that current year marketing and administration expenses as moderators cause a lag of three years in the average collection period and each for moderator to have a positive impact on profitability, while the current year average collection period had a negative impact on profitability. It is, therefore, recommended that LMCs in Tanzania should consider the previous three years' average collection period, administration expenses, marketing expenses, and effectiveness in managing working capital to enhance their profitability.

Keywords: Average collection period, Average payment period, Number of day's inventory, Cash conversion cycle, Profitability, DuPont analysis.

JEL Classification: M1, M3, M4.

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Contribution of this paper to the literature

This study contributes to the current literature by ascertaining the influence of Working Capital Management on Listed Manufacturing Companies' profitability in Tanzania measured by the DuPont Analysis and the moderating effect of administration and marketing expenses between WCM and LMCs' profitability using the finite distributed lag model.

1. Introduction

Working capital management (WCM) and company profitability are subjects that have attracted much attention around the world from academics and business companies (Nwakaego & Ikechukwu, 2016). This is because working capital management is the vital element of the companies' investment, control of circulating capital which is the heart of all business companies, and a measure of cash as well as the short-term business situation (Utia, Dewi, & Sutisna, 2018). Profitability on the other hand is the capacity of companies to earn revenue associated with sales, total assets, and owned capital (Sartono, 2010).

However, globally, several LMCs have been facing profitability challenges (Tingbani, 2020). In Africa, several LMCs have faced declining performance to the extent of being placed under receivership, and de-listing due to failure to pay dividends and other current liabilities (Wanyoike, Onyuma, & Kung'u, 2021).

Similarly, in Tanzania some LMCs have experienced losses as it is indicated by their financial reports published by the DSE resulting in a small contribution to the country's economy.

Although the literature reviewed back the idea that working capital management influences profitability (Achode & Rotich, 2016; Ponsian, Chrispina, Tago, & Mkiibi, 2014) there are conflicting results since some studies found that the same variables of working capital revealed a positive relationship with companies' profitability, while a negative relationship with companies' profitability was found in other studies (Awan, Shahid, Hassan, & Ahmad, 2014; Ponsian et al., 2014). These conflicts are mainly due to companies operating in different economies and different environments. For instance, an environment with an unforeseen interruption in the supply of raw materials forces companies to keep a large inventory to ensure continuity of production, supply, and a positive impact of the number of days inventory on profitability (Amponsah-Kwatiah & Asiamah, 2021; Olaoye, Adekanbi, & Oluwadare, 2019).

Moreover, the studies reviewed did not consider the moderating effect that administration and marketing expenses have on the relationship between WCM and LMCs' profitability. Taking into consideration that some of the LMCs used in this study have been making losses although they are open to the public for investment and the fact that they should have competent employees, this study examined the effect of the two moderating variables on their management of current capital.

Additionally, the reviewed literature did not use the DuPont analysis to measure profitability as in this study; instead, they used ROE which is disaggregated to get the DuPont analysis. Also, unlike the previous studies, this study used a finite distributed lag model to analyze the relationship between WCM and profitability of LMCs in Tanzania. Therefore, this study attempted to fill the above literature gaps of knowledge by using Tanzanian-listed manufacturing companies guided by the following hypothesis:

HO₁: Cash management has no significant influence on the profitability of LMCs in Tanzania.

HO₂: Inventory management has no significant influence on the profitability of LMCs in Tanzania.

HO₃: Accounts receivable management has no significant influence of on the profitability of LMCs in Tanzania.

HO₄: Accounts payable management has no significant influence on the profitability of LMCs in Tanzania.

HO₅: There is no significant moderating effect of administration expense on WCM and profitability of LMCs in Tanzania.

HO₆: There is no significant moderating effect of marketing expense on WCM and profitability of LMCs in Tanzania.

2. Research Methodology

2.1. Research Design

According to Utia et al. (2018) an explanatory research design is suitable where the scholar is endeavoring to explicate how the phenomenon functions by finding the fundamental factors that produce a change in it, in which case there is no independent variable manipulation. This study adopted an explanatory research design to analyze the influence of working capital management on the profitability of LMCs in the DSE, Tanzania.

2.2. Targeted Population

The populations were all cross-sectionals from the year 2005 to 2018 inclusive from each of the six listed manufacturing companies, hence making a total population of 84 cross sectionals (6 companies x 14 fourteen financial statements years) = 84 cross sectionals).

2.3. Sampling Frame & Techniques

Because of panels; a census approach was used to incorporate all six LMCs.

2.4. Data Collection Methods and Tools

Data were collected from audited annual financial statements of listed manufacturing companies listed on DSE. The variables used in this study were cash holding ratio for cash management, the number of days' inventory for inventory management, average collection period for receivables' management, and average payment period for payables' management as independent variables and the DuPont analysis to explain company profitability. The moderating variables are administration expenses and marketing expenses. All these variables' data were extracted from the financial statement of these LMCs' websites.

2.5. Validity and Reliability

Because the data were extracted from companies' published audited financial statements they, therefore, produced valid results. The internal validity was verified with evidence that working capital management influenced profitability.

2.6. Statistical Treatment of Data

In this study, the Finite Distributed Lags Regression Model was used to examine the influence of cash holding ratio (CHR), average payment period (APP), average collection period (ACP), and the number of days inventory (NDI) on the DuPont analysis. Since a change of independent variable may not cause an immediate change of dependent variable, the Finite Distributed Lag Model (FDL) known as the Geometric Distributed Lag Model (GDLM) or Koyck Distributed Lag Model (KDLM) was used in the form of autoregression, in case of secondary data, to predict current values of a dependent variable based on current values of explanatory variables and a maximum number of lagged values of these explanatory variables.

Usually, autoregressive models involve using one or more lagged values of y as determinants of the current value y_t . The Koyck lag model is the simplest one, which has one lag of y with only the current value of x as repressors. Adding lagged values of x in addition to lagged y variables leads to the rational lag model. Contrary to the vector autoregression (VAR) model, which uses endogenous variables only with all variables having equal lags, the ARDL model uses both endogenous and exogenous variables where variables may have different lags.

The use of panel data rather than time-series data not only increases the total number of observations and their variations, but also reduces the noise coming from the individual time series. Hence testing for heteroscedasticity and normality is not necessary for panel data analysis.

2.7. Model and Mathematical Specification for Panel Data

A panel of data has both time series and cross-sectional elements that embody quantitative information of the same entities over time across both time and space. Hence, strictly, if the data are not on the same entities (for example, different firms or people) measured over time, then this would not be panel data. Introducing a lagged dependent variable in a cross-sectional equation helps not only to increase the data requirements but also to provide a simple way to account for unnoticed historical factors about the dependent variable that cause or contribute to current differences in the dependent variable. Initial effects are also captured by putting in lags of y (Wooldridge, 2009). This study uses the Panel multiple linear regressions in the form of the autoregressive distributed lag model that includes one or more lagged values of the dependent variable among its explanatory variables. It is also known as dynamic distributed-lag mode since it portrays the time path of the dependent variable about its past value. Taking into consideration that the optimal lag was three and that all variables were stationary at $I(0)$, the model can be specified as follows:

$$DUPONT_L = \alpha + \sum_{L=1}^{L=3} (\beta_{DL} DUPONT_L) + \sum_{L=0}^{L=3} \left(\beta_{CL} CHR_L + \beta_{AL} ACP_L + \beta_{PL} APP_L + \beta_{IL} NDI_L + \beta_{AL} ADMEXP_L + \beta_{ML} MKEXP_L \right) + e$$

Where:

- L = Lag year where L=lag 0 (current year), L1=1lag, L2=2 lags and L2=3 lags.
- DUPONT = Profitability in terms of DuPont.
- α = DUPONT assuming that all dependent variable are constant.
- β_{DL} = Coefficient for lag in DuPont.
- CHR = Cash holding ratio (cash management).
- β_{CL} = CHR coefficient with lag.
- ACP = Average collection period (receivable management).
- β_{AL} = ACP coefficient with lag.
- APP = Average payable period (payable management).
- β_{PL} = APP coefficient with lag.
- NDI = Number of days inventory (inventory management).
- β_{IL} = NDI coefficient with lag.
- ADMEXP = Administration expenses.
- β_{AL} = ADMEX coefficient with lag.
- MKTEXP = Marketing expenses.
- β_{ML} = MKTEX coefficient with lag.

Then all β s were tested to see if they are significant at $\alpha = 0.001, 0.05$ and 0.01 . Significant β shows that the dependent factor has an impact on DUPONT.

Since the study focused on manufacturing companies that may have different characteristics, the panel method was used to analyze companies as a group, rather than individually. The study used Stata version 14 to analyze the data that was collected from the listed manufacturing companies' financial statements. Hence, the unit of analysis in this study is the manufacturing company. The panel used is a heterogeneous panel since the number of groups (six companies studied) is less than the number of years (fourteen years: from 2005 to 2018). In this study, Finite Distributed Lags Regression Model was used to examine the influence of cash holding ratio (CHR), average payment period (APP), average collection period (ACP), and the number of days inventory (NDI) on the DuPont analysis. Since a change of the independent variable may not cause an immediate change of the dependent variable, the Finite Distributed Lag Model (FDL) known as the Geometric Distributed Lag Model (GDLM) or Koyck Distributed Lag Model (KDLM) was used in the form of autoregression to predict current values of a dependent variable based on current values of explanatory variables and a maximum number of lagged values of these explanatory variables. The multicollinearity diagnostic was done by using the correlation matrix analysis and the

Variance Inflation Factor (VIF) where a VIF of less than ten shows the absence of multicollinearity as required by panel models. The unit root diagnostic was done by using Levin-Lin-Chu (LLC) test with one lag,

This study uses the Panel multiple linear regressions in the form of the autoregressive distributed lag model that includes one or more lagged values of the dependent variable among its explanatory variables.

The Wilks' lambda, Pillai's trace, Lawley-Hotelling trace, and Roy's largest root tests were also done to ascertain the equality of the group. All test results for equality of the six group means are satisfactory and therefore the homogeneity of the means is assumed.

Table 1. Correlations matrix analysis.

Pearson Correlation, N=84		Year	CHR	ACP	APP	NDI	ADMEXP	MKTEXP	Dupont
YEAR	Correlation	1.000							
	Sig. (2-tailed)								
CHR	Correlation	-0.052	1.000						
	Sig. (2-tailed)	0.638							
ACP	Correlation	0.171	-0.592*	1.000					
	Sig. (2-tailed)	0.120	0.000						
APP	Correlation	0.316*	0.049	0.187	1.000				
	Sig. (2-tailed)	0.003	0.660	0.089					
NDI	Correlation	0.213	0.400*	-0.382*	0.374*	1.000			
	Sig. (2-tailed)	0.052	0.000	0.000	0.000				
ADMEXP	Correlation	0.034	0.098	0.104	0.065	-0.263*	1.000		
	Sig. (2-tailed)	0.759	0.375	0.346	0.559	0.016			
MKTEXP	Correlation	-0.034	-0.043	-0.116	-0.028	0.185	-0.872*	1.000	
	Sig. (2-tailed)	0.757	0.698	0.291	0.799	0.091	0.000		
DUPONT	Correlation	-0.178	0.394*	-0.369*	-0.011	0.227*	-0.043	0.270*	1.000
	Sig. (2-tailed)	0.105	0.000	0.001	0.920	0.038	0.700	0.013	

Note: *. Correlation is significant at the 0.05 level (2-tailed).

According to Table 1, the coefficient of the cash holding ratio shows a positive and significant relationship with the DuPont analysis as indicated by $\beta = 0.394$, at 0.05 level of significance, meaning that the unit increase in cash holding ratio leads to an increase in the DuPont analysis by 0.394 units. The average collection period is negatively and significantly related to the DuPont analysis with $\beta = -0.369$ at 0.05 level of significance, indicating that a unit increase of the average collection period will lead to a decrease in the DuPont analysis by 0.369 units. The number of days inventory is positively and significantly related to the DuPont analysis with $\beta = 0.227$ at 0.05 level of significance. This means that the unit increase of the number of day's inventory increases the DuPont analysis by 0.227 units. The other variables do not indicate a significant relationship with the DuPont analysis.

Table 2. Fixed effect regression of working capital variables on profitability.

DUPONT	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig.
CHR	1.23	0.582	2.11	0.038	0.07	2.391	**
ACP	-0.347	0.188	-1.85	0.068	-0.721	0.026	*
APP	-0.066	0.048	-1.36	0.177	-0.162	0.03	
NDI	0	0.073	0.01	0.995	-0.145	0.146	
Constant	37.267	12.821	2.91	0.005	11.721	62.814	***
Mean dependent var	25.996	SD dependent var		26.278			
R-squared within	0.1390	Number of observations		84.000			
R-squared between	0.3233	Prob > F		0.004			
Overall R-squared	0.1630	Bayesian crit. (BIC)		774.171			
F-test	2.9880	Akaike crit. (AIC)		762.017			
Fixed effect regression of working capital with their lags on profitability							
DUPONT	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
CHR	1.676	0.802	2.09	0.042	0.066	3.286	**
ACP	-0.363	0.267	-1.36	0.181	-0.899	0.174	
APP	-0.024	0.053	-0.45	0.653	-0.131	0.083	
NDI	0.107	0.118	0.90	0.372	-0.131	0.344	
L2.CHR	1.233	0.725	1.70	0.095	-0.222	2.687	*
L2.ACP	-0.531	0.323	-1.64	0.106	-1.179	0.118	
L3.ACP	1.011	0.347	2.91	0.005	0.314	1.707	***
L.APP	0.078	0.074	1.05	0.297	-0.071	0.228	
L.NDI	-0.124	0.125	-0.99	0.327	-0.375	0.127	
Constant	-2.495	25.312	-0.10	0.922	-53.311	48.322	
Mean dependent var	25.337	SD dependent var		27.160			
R-squared within	0.3146	Number of observations		66.000			
R-squared between	0.8280	Prob > F		0.023			
Overall R-squared	0.4100	Bayesian crit. (BIC)		628.783			
F-test	2.168	Akaike crit. (AIC)		606.887			

Note: *** p<.01, ** p<.05, * p<.1.

Table 2 reveal that the cash holding ratio and the average collection period contribute to the fixed effect regression of working capital variables on profitability at 0.05 and 0.1 level of significance and constant having a strong contribution to the model at 0.01 level of significance. The model is not plausible with the use of the independent variables alone because the overall R-squared is 0.1630 which means that only 16% of the variability of the dependent variable is explained by the model.

Table 3. Regression results of WCM variables, lags and moderators on profitability.

DUPONT	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig.
CHR	0.927	0.847	1.09	0.28	-0.784	2.638	
ACP	-0.942	0.404	-2.33	0.025	-1.758	-0.125	**
APP	-0.064	0.059	-1.09	0.284	-0.183	0.055	
NDI	0.038	0.123	0.31	0.757	-0.21	0.287	
L2.CHR	0.375	0.857	0.44	0.664	-1.354	2.105	
L3.CHR	-0.341	0.739	-0.46	0.647	-1.833	1.151	
L.ACP	0.316	0.416	0.76	0.453	-0.525	1.156	
L2.ACP	-0.144	0.42	-0.34	0.734	-0.992	0.705	
L3.ACP	0.784	0.36	2.18	0.035	0.058	1.511	**
L.APP	0.071	0.075	0.95	0.349	-0.081	0.224	
L2.APP	-0.017	0.108	-0.16	0.874	-0.236	0.201	
L3.APP	0.03	0.119	0.25	0.801	-0.21	0.27	
L.NDI	-0.09	0.142	-0.64	0.528	-0.377	0.196	
L2.NDI	-0.009	0.147	-0.06	0.95	-0.307	0.288	
L3.NDI	0.153	0.147	1.04	0.302	-0.143	0.45	
ADMEXP	1.231	0.37	3.33	0.002	0.484	1.979	***
MKTEXP	1.519	0.497	3.06	0.004	0.515	2.522	***
L.MKTEXP	0.33	0.534	0.62	0.541	-0.749	1.409	
L.DUPONT	0.15	0.137	1.10	0.279	-0.126	0.427	
Constant	-135.676	47.861	-2.83	0.007	-232.335	-39.018	***
Mean dependent var		25.337	SD dependent var			27.160	
R-squared within		0.4851	Number of observations			66.000	
R-squared between		0.8323	Prob > F			0.022	
Overall R-squared		0.5216	Bayesian crit. (BIC)			648.255	
F-test		2.0330	Akaike crit. (AIC)			604.462	

Note: *** p<.01, ** p<.05.

Table 3 indicates that the average collection period and its lag 3 have significant negative and positive effects on the model as evidenced by $\beta = -0.942$ and $\beta = 0.784$ at a 0.05 level of significance. The administration expenses and marketing expenses strongly moderate working capital management as evidenced by $\beta = 1.231$ and $\beta = 1.519$ at a 0.01 level of significance. The model is plausible since the overall R-squared is 0.5216 which means that 52% variability of the dependent variable is explained by the model.

The results indicate ACP negatively and significantly related to profitability meaning that the unit increase in average collection period will lead to a decrease in the dependent variable by .942 units, but a positive relationship with the lags, showing the unit increase of average collection period at lag 3 will lead to an increase of the dependent variable by .784 units. Furthermore, the result has shown the two moderating variables to be the perfect moderators that positively moderate the relationship between working capital management and profitability as shown by administration expenses $\beta = 1.231$ and marketing expenses $\beta = 1.519$ at a 0.01 level of significance.

3. Results

3.1. To Determine the Influence of Cash Management on Profitability

This objective was represented by the null hypothesis as follows:

H_{01} : Cash management has no significant influence on the profitability of LMCs in Tanzania.

The analysis in Table 1 revealed that cash management measured by cash holding ratio had a positive and significant relationship with the DuPont analysis as indicated by $\beta = 0.394$, $p = 0.05$ level of significance unit increase of CHR leads to an increase of the DuPont analysis by 0.394 units. This further means that the increase in the cash balance of a company leads to an increase in profitability. With enough cash holding the company can meet its maturing obligations when they become due.

In Table 2, the fixed effect regression of working capital variables on profitability showed that CHR has a positive and significant relationship with profitability without the moderating variable as indicated by $\beta = 1.23$, $p = 0.038$. This indicates that CHR representing cash management has an influence on profitability without the moderators used in this study. It revealed the same result in the fixed effect regression of working capital variables with their lags on profitability as shown in the second part of Table 2 without the moderators used in this study. Here, CHR is seen influencing profitability with its lag two showing partial positive and a significant relationship with profitability represented by $\beta = 1.676$, $p = 0.042$ and $\beta = 1.233$, $p = 0.095$. We can conclude that the analysis indicated that cash management has a positive and significant relationship with profitability measured by the DuPont analysis. Due to the above results of the data analysis, we reject the null hypothesis and accept the alternative hypothesis that cash management has a significant influence on the profitability of LMCs in Tanzania.

3.2. To Determine the Influence of Inventory Management on Profitability

This objective was represented by the null hypothesis as follows:

H_{02} : Inventory management has no significant influence on profitability in terms of the DuPont assessment for LMCs in Tanzania.

In Table 1 correlation matrix analysis reveals the number of days inventory having a positive and significant relationship with the DuPont assessment as indicated by $\beta = 0.227$, $p = 0.038$ which means the unit increase in the number of days inventory leads to an increase in profitability measured by the DuPont assessment by 0.227 units. In Tables 2, and 3, the number of day's inventory is revealed to have no influence on LMCs profitability measured by the DuPont assessment. The number of day's inventory has no significant influence on company profitability neither with the fixed-effects model or the random-effects model even when the lags and moderators are introduced into the model.

Although some models indicated an insignificant relationship between inventory management and profitability, there is a relationship between inventory management and profitability. Therefore, due to those indicating significant relationships, we reject the null hypothesis and accept the alternative hypothesis that inventory management has a significant influence on the profitability of LMCs in the DSE.

3.3. To Determine the Influence of Receivables' Management on Profitability

This objective was represented by the null hypothesis:

H_{04} : Receivable management has no significant influence on profitability based on the DuPont assessment for LMCs in Tanzania.

In Table 2, the fixed effect regression of working capital variables on profitability indicates the average collection period having a negative and significant relationship with profitability without moderators and lags. The fixed effect regression of working capital management with lags on profitability, average collection period has shown a strong positive relationship with profitability at its lag 3 as indicated by $\beta = 1.011$, $p = 0.01$. In Table 3 the regression results showed the average collection period having a negative and significant relationship with profitability at a 0.05 level of significance as indicated by $\beta = -942$, $p = 0.025$ meaning that a unit increase in average collection period will lead to a decrease in profitability by 0.0942 units. With its lag 3, the result indicates a positive relationship between the average collection period and profitability of LMCs in the DSE as shown by $\beta = 0.784$, $p = 0.035$ meaning that a unit increase in the average collection period will also lead to an increase in profitability (DuPont) by 0.784 units. This will further mean that in 2015 the companies extended credit sales to capture the market before going back to the regular negative relationship to reduce day's receivables management to improve liquidity. Due to the above results from the data analysis, we reject the null hypothesis and accept the alternative hypothesis that receivables' management has a significant influence on the profitability of LMCs in the DSE.

3.4. To Determine the Influence of Payables' Management on Profitability

This objective was represented by the null hypothesis as follows:

H_{04} : Payable management has no significant influence on profitability in terms of DuPont for LMCs in Tanzania.

According to Table 1, the correlation matrix analysis results show that the average payment period has a negative and significant relationship with profitability measured by DuPont as indicated by $\beta = -0.011$. Table 3 indicates the average payment period having an insignificant negative relationship with profitability as indicated by $\beta = -0.064$, $p = 0.284$.

3.5. To Find out the Impact of Administration Expenses as a Moderating Variable

This objective was represented by the null hypothesis:

H_{05} : Administration expense has no impact on WCM and profitability of LMCs in the DSE.

In the regression results which have WCM variables, lags, and moderators in Table 3, the administration expenses are shown to improve the relationship between receivables management and its lag 3 and profitability measured by the DuPont assessment. The percentages of changes in profitability were improved from Adjusted R-squared of approximately 37% to 52.2%. Collaborating with marketing expenses, administration expenses is the perfect moderator to the relationship between the average collection period and the DuPont assessment. This suggests that improving remuneration improves morale and job satisfaction, which leads to improved management of receivables and increased company profitability.

3.6. To Find out the Impact of Marketing Expenses as a Moderating Variable

This objective was represented by the null hypothesis:

H_{06} : Marketing expenses have no impact on WCM and profitability of LMCs in the DSE.

In Table 3 with the overall regression results, the findings show marketing expense have a positive and significant relationship with profitability (DuPont) as indicated by $\beta = 1.519$, $p = 0.004 < 0.01$ level of significance. This result means that a unit increase in marketing expense will improve WCM and leads to an increase in profitability (DuPont) by 1.519 units. With the above results, we can reject the null hypothesis and accept the alternative hypothesis that marketing expenses have a moderating impact on the relationship between WCM and profitability of the LMCs in the DSE.

4. Discussion

The purpose of this section is to discuss the findings of specific objectives in responding to the problem of this study. The discussion is on the results in response to the six specific objectives below.

4.1. The Influence of Cash Management on Profitability

The correlation matrix results in Table 1 reveal cash holding ratio (CHR) has a positive and significant relationship with profitability and are also the same results that are revealed in Table 2. This means that the increase in the company's cash balance leads to an increase in profitability. With enough cash holding the company is able to meet its maturing obligations when they become due.

The other studies that are in line with the findings of this study are Augustine and Jacob (2017); Das (2017) and Iftikhar (2017) who contend that the companies with enough cash holding are the companies that perform well financially and increase their profitability.

The results show that if the companies increase their cash holding, their profitability will be increased because they will have enough cash to meet their expenditures and even make more investments into the same business or other businesses for expansion and operations. However, the results of this study are contrary to the results of the study by Abushammala and Sulaiman (2014) who revealed that companies having high cash holding do not take advantage of the investment of their cash in gainful business opportunities.

The introduction of lags in the fixed effects regression of working capital variables on profitability in [Table 2](#) also showed that the decisions made on the cash management in 2016 which is lag 2 also had an influence on the current year's cash management. In other words, the companies needed to use the cash management information in 2016 to make good decisions about how to manage it in the current year. The companies can manage their current year cash well by making use of the historical decision and information on cash management or by observing what ways were used to manage cash in the past and the impact it had on profitability.

If the way cash was managed did not bring good results, change will be needed. With lags observation, we further see the implication that the previous price and quality of the company's products impacted past sales either negatively or positively. The impact of higher prices for the product in 2016 could reduce the number of customers using the product; poor quality in like manner would also reduce the customers in the same year or lag 2. The effect of these two happenings would impact the sales in 2017 and even in 2018. Observing such past operations can assist in planning for the current business well-being and plans for the business's future. The results have shown that the companies that have good cash management have also enough cash holding for operations and have experienced increased profitability as evidenced by Tanga Cement and Tanzania Breweries that have good cash management. The results for TATEPA and Tanzania Oxygen on poor cash management are evidenced by their struggle to meet their recurring obligations because of having insufficient cash.

4.2. The Influence of Inventory Management on Profitability

According to the findings from the results section, the correlation matrix analysis for secondary data in the results section [Table 1](#) revealed a positive and significant relationship between the number of days inventory and profitability meaning that increasing the number of days that inventory is in storage increases profitability against the cash conversion cycle theory, but in line with the findings of previous studies that indicated the longer time it takes to sell out inventory contributes to increased profitability of companies ([Boisjoly, Conine, & McDonald, 2020](#); [Nwachukwu, Odo, & Nwachukwu, 2016](#)). This means that having enough storage of inventory can help in the continuity of production and supply in the time of scarcity of raw materials and finished products in the market for unforeseen events which could be political or natural calamities etc.

However, a longer stay of inventory in storage can also mean that they are not of the quality needed by the market or customers and competition in the market may be strong if the company does not have an aggressive marketing strategy for its products. The other findings in [Table 2](#) in the results section show that inventory management indicates a negligible relationship with profitability. The number of day's inventory is revealed as having no significant relationship with companies' profitability from the analysis of the data without moderators, with moderators, and fixed effects regression with components' lags in [Table 2](#).

4.3. The Influence of Receivables' Management on Profitability

Furthermore, the correlation matrix analysis as reported in the findings section, showed an inverse relationship between ACP and profitability measured by the DuPont assessment. This suggests that the companies that made a profit observed the reduction of the time they took in collecting cash from credit sales, although in this way the sales volume and profitability are reduced while liquidity is increased. These findings agree with the findings of the previous studies by [Pais and Gama \(2015\)](#) and [Yakubu, Alhassan, and Fuseini \(2017\)](#) that reducing the days that collection of cash from credit sales takes increases LMCs' profitability. This further means that more sales are on a cash basis. The implication here is that LMCs can increase their profitability by ensuring that the average collection period is reduced while observing the sales trend to be alerted as and when they can extend reasonable credit sales to increase sales volume to maintain or even increase their customers and company profitability.

A very important finding of this study concerning receivables management is the one in [Table 2](#). The fixed effect panel regression of working capital variables on profitability indicate a partial inverse significant relationship between average collection period and profitability without observing the effect of administration expenses, marketing expenses, and the historical or previous management decisions and actions in terms of lags effects on the same variable management. The result with lags further means that in a very competitive market or when a new product is introduced into the market, the credit sales in the first year will affect the sales for some following years to increase profitability before the company starts collecting cash to increase liquidity to sustain the business.

Furthermore, the implication may also be that due to the quality of the product, which could lead to increased selling price, the companies had to practice more credit extension periods as a way of attracting buyers and even increasing sales volume to new customers in 2015. This undertaking could take two years before controls of receivables and their reduction are enacted. This result is supported by the study of [Demirgüneş \(2015\)](#) who studied the determinants of target dividend payout ratio and found that historical items related to profitability affect future target dividend payout. Demirgüneş's paper suggests that the dividend paid year-to-year depends on the past years' income and even the year-to-year income growth. This is the same as the finding of this study that some companies' growth in profitability is influenced by the credit sales made in 2015 before they went back to the normal practice of reducing the days of cash collection from credit sales as revealed in the 2018 results.

The dynamic model of advertising cost with continuously distributed lags by [Lutoshkin and Yamaltdinova \(2018\)](#) suggests that companies can plan their current business well by using historical and accumulated information. The above results on lag 3 of the average collection period in 2015 on receivables can be used to make the decision on what to do for the current and future management of debtors. The decision made in 2015 whether to increase the price for the new and better quality product or to offer more credit sales to make the product better known to the market while also trying to increase sales volume for the old product attracting new customers affected the sales by either reducing or increasing the number of buyers and simultaneously increasing receivables and defaulters. This affected the performance of the business in both the past and the current period.

4.4. The Influence of Payables' Management on Profitability

According to the results section of this study, [Table 1](#) revealed a negative insignificant relationship between the average payment period and profitability, which infers that taking a few days to pay the suppliers is also part of

good payables management and this builds up the company's relationship with its creditors and ensures a continuous supply of materials needed for production. This result is also realized in Table 3 with the fixed effects panel regression of data. The results here mean that sometimes taking a short time to pay suppliers increases profitability in the sense that there will be no stoppage of the supply of raw materials hence continuing the flow of sales leading to increased profitability. This finding is also replicated in the studies by Asaduzzaman and Chowdhury (2014); Kasozi (2017) and Sathyamoorthi, Mapharing, and Selinkie (2018) which also revealed APP having a negative and significant relationship with profitability. However, the results of this study contradict several reviewed studies that indicated average payment period and profitability having a positive relationship (Achode & Rotich, 2016; Amponsah-Kwatiah & Asiamah, 2021; Kasahun, 2020; Yakubu et al., 2017). For these studies, the longer the delay in paying suppliers will result in more free short-term financing facilities for the companies that invested in the business to further increase their profitability.

4.5. The Impact of Administration Expenses as a Moderating Variable

Administration expenses are considered in this scholarly work to find out how increased spending on administration and employees in general impact the relationship between working capital management and LMCs' profitability.

According to the results, Tanzania Breweries and Tanzania Cigarette companies are making a profit without spending much on their administration because it seems that their products are well known with sufficient customers due to their monopoly position in the market. Whether or not they increase their revenues, they are not suffering losses. However, in the long run companies can suffer losses due to poor performance leading to low morale of employees and administration is debased due to low payment or lack of motivation. This seems to be one of the reasons why TATEPA has been making losses for several years. According to the results of having low means of administration expenses, the company is not investing enough in its human resource. This reduces the incentive to work efficiently and lowers the performance of the company.

4.6. The Impact of Marketing Expenses as a Moderating Variable

The marketing expenses in this study are considered as a moderating variable to capture the impact it has on the relationship between working capital management and LMCs' profitability. Since marketing is what connects the companies' products with consumers, marketing expenses were thought of as a vital link between working capital management and company profitability.

According to the overall panel regression model results in the findings section in Table 3, marketing expenses have a positive and significant relationship with profitability (DuPont). The findings section shows marketing expenses moderating effect strongly contributing to strengthening the relationship between receivables management and its lag 3 with profitability. However, it has weakened the relationship between other independent variables and LMCs' profitability, although the plausibility of the model has improved from 0.395 previously to 0.5216 meaning that the change in profitability is a dependent variable measured by the DuPont assessment explained by the model is improved from 39.5% to 52.16%.

This last result implies that in managing current assets and current liabilities, these LMCs need to closely observe what happened in the past and current management of receivables and also increase marketing strategies and remuneration for their employees to continue improving their profitability. The decisions made about receivables management in 2015 contributed to the current year's influence of receivables management on profitability moderated by ADMEXP and MKTEXP.

5. Conclusion, Contribution and Recommendations

This section brings the summary of the main findings of research based on the six specific objectives of the study, the conclusions, and implications as a result of the study, and the recommendations for improving LMCs' profitability and further inquiry.

5.1. The Influence of Cash Management on LMCS' Profitability

Panel data analysis, whether with or without lags, shows that the current cash holding ratio has a significant positive relationship with LMCs' profitability, but had no significant effect when moderators were introduced.

5.2. The Influence of Inventory Management on LMCs' Profitability

The number of day's inventory has no significant influence on profitability explained by the DuPont assessment.

5.3. The Influence of Receivables Management on LMCs' Profitability

Moderators (administration expenses and marketing expenses) increase the negative impact of current ACP on profitability ($\beta = -0.94$) at a 0.05 level of significance, while the three years' lag of ACP (L3.ACP) has a positive impact on profitability ($\beta = 0.78$) at 0.05 level of significance. The negative impact of current ACP on profitability implies that decreasing current average days to collect cash from credit sales improves company profitability while the positive impact of ACP (L3.ACP) on profitability implies that increased days to collect cash over the past three years led to the increase in the current year's profitability of LMCs. This result implies that decisions about managing receivables made in 2015, or the third year back, had an effect on the current period as far as receivables and cash management is concerned and influenced companies' profitability.

5.4. The Influence of Payables Management on LMCS' Profitability

The study found that the average payment period did not have a significant influence on LMCs' profitability even when the lags and moderators were introduced.

5.5. The Impact of Administration and Marketing as Moderating Variables

This study revealed that moderators (administration expenses and marketing expenses) increase the negative impact of ACP on profitability ($\beta = -0.94$) at a 0.05 level of significance, causing the three years' lag of ACP (L3.ACP) to have a positive impact on profitability ($\beta = 0.78$) at 0.05 level of significance, while each moderator has a positive impact on profitability as indicated by ($\beta = 1.23$) and ($\beta = 1.52$) respectively at 0.01 level of significance. Hence, increasing administration expenses strengthens the negative impact of the average collection period on LMCs' profitability from 0.1 to 0.05 level of significance. This implies that increasing salaries and other benefits improve workers' morale to collect receivables quickly, which in turn increases company profitability.

The current marketing expenses have a significant positive effect on profitability if it is included in the model by increasing the level of significance from 0.1 to 0.05. It implies that spending on marketing of the products contributes to improving the positive impact of receivables management (reducing the number of days that the companies take to collect payment from debtors) and in this way increases company profitability.

5.6. Conclusions

Based on the results of this study, several logical conclusions and implications can be made for the objectives of the study as follows:

5.6.1. The Influence of Cash Management on Profitability

Referring to the evidence from the econometric analysis using correlation matrix, panel multiple regression, and finite distributed lag model, we conclude that observing the previous decisions and procedures used to manage cash can help in improving the current management of the variable and this will contribute to increasing the manufacturing companies' profitability. The historical information on how cash was managed helps to rectify certain problems that could hinder the growth of the companies' profitability.

5.6.2. The Influence of Inventory Management on Profitability

Referring to the empirical results, the insignificant negative relationship between the number of days inventory and company profitability also means that reducing the number of days inventory increases companies' profitability because inventories are moving from storage to sales.

5.6.3. The Influence of Receivables' Management on Profitability

The positive impact of the three years' lags of average collection period (ACP) which, in this case is 2015, and each of the moderators indicates that implementing extended credit sales to customers to an acceptable level increased sales volume and profitability in 2015 and also brought a positive effect on the current period and company profitability. Additionally, this means that by taking note of the past events on receivables behaviour, management can increase the current company profitability because what happened previously can inform some improvement plans. Furthermore, the management can continue to increase the company's profitability if they improve employees' well-being including salaries and allowances and other benefits, and also increase necessary spending on marketing of their products as they manage their current capital as this will increase profitability.

5.6.4. The Impact of Administration Expenses as a Moderating Variable

We conclude that administration expenses are a perfect moderator between working capital and listed manufacturing companies' profitability. This implies that increasing expenditure on administration, raising salaries and other benefits will increase the workers morale, improve working capital management and listed manufacturing companies' profitability. Its introduction contributes to improving the influence of WCM on profitability as indicated by the positive change of the R-squared from 41% to 52.2%.

5.6.5. The Impact of Marketing Expenses as a Moderating Variable

The empirical evidence revealed that marketing expenses perfectly and positively moderate working capital management and listed manufacturing companies' profitability. This implies that increasing spending on marketing products will make them better known to customers, increase sales volume, and by doing so working capital management will be improved and listed manufacturing companies' profitability increased.

5.7. Contribution of the Study

The key contributions made by this study to the stock of knowledge are:

First, this study has revealed that the lags can be used to explain the LMCs' profitability in terms of working capital management aspects. The current capital can be improved by using previous information and can help devise improved ways of managing working capital currently and plan well for the future and increase profitability. Second, this study contributes to knowledge by showing that working capital management indicate that the three-year lag of average collection period (L3ACP) has a positive influence on working capital management and that current administration expenses and current marketing expenses have a significant positive impact on the relationship between working capital management and LMCs' profitability. This shows that observing administration expenses and dealing with the marketing of products can help LMCs' improve working capital management and continue increasing profitability. Third, this study is the first attempt to investigate the influence of working capital management on profitability of the listed manufacturing companies in Tanzania measured by the DuPont assessment. Using the DuPont assessment can help companies to see the total picture of their performance by using the three elements of net profit margin, assets turnover, and equity multiplier. Fourth, methodologically, this study contributes to knowledge by examining the influence of working capital management on profitability by using the finite distributed lag model. With this approach, this study revealed that to plan well and improve current working capital management, the company's past management should be considered.

Fifth, theoretically, this study contributes to knowledge by synthesizing cash conversion cycle theory, trade credit theory, economic order quantity theory, and consumer demand theory and, therefore, establishes a comprehensive theoretical framework that gives a new holistic analytical way of examining working capital components as determinants of profitability of LMCs.

5.8. Recommendations

Based on the findings of this study, the following are recommendations made.

5.8.1. Recommendations for Improving Manufacturing Companies

Firstly, with cash management, besides maintaining a shorter cash cycle, the financial directors should establish an optimal cash balance to ensure that they don't overspend. In this way, the companies will have enough cash to meet their recurring obligations. Secondly, with inventory management, these listed manufacturing companies should make sure they reduce the number of days that they hold their inventory to increase sales and improve profitability. Thirdly, with receivables management, these LMCs should ensure they reduce the number of days taken to collect payments from credit sales after they have made their products known to the market, and they should also observe past decisions that were made in managing receivables to do well in the current receivables' management in order to increase LMCs' profitability. Fourthly, administration and marketing expenses should be observed and increased or reduced whenever necessary to increase employees' morale, and market the products to ensure increased sales and profitability.

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