

Management Accounting Practices and Financial Performance of Manufacturing Firms: Moderating Role of Information Technology Integration

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Abstract

This study assessed the moderating role of information technology integration (ITI) in the relationship between management accounting practices (MAPs) and financial performance (FP) of manufacturing firms. MAPs comprise five dimensions namely; Costing System (CS), Budgeting System (BS), Decision Support System (DSS), Performance Management System (PMS) and Strategic Management Accounting Practices (SMAP). This research applied the cross-sectional survey design to obtain data from managers of manufacturing companies in Ghana. Data from 266 respondents were processed using Smart PLS (version 4) and analysed using the Structural Equation Modeling. The study found a significant positive moderating role of ITI in the relationship between a dimension of MAPs called performance management systems (PMS) and FP. The research contributes to the literature on MAPs by empirically establishing the role technology plays in the MAPs and FP nexus. These findings extend the literature on the role of ITI by encouraging manufacturing firms in Ghana to implement ITI skills and PMS to enhance their FP. The study recommends that leadership of manufacturing firms in Ghana should blend PMS (like ratio and variance analysis) as well as ITI skills to boost their financial performance.

Keywords

Information Technology Integration, Management Accounting Practices, Financial Performance

1. Introduction

In line with the Sustainable Development Goals (SDGs), human beings in the world should live in peace and prosperity by 2030. SDG 8, for instance, encourages world leaders to implement appropriate policies to promote sustainable economic growth, gainful employment, and decent jobs for all. According to [Ledhem & Mekidiche \(2020\)](#) financial performance of firms contributes to economic growth. This implies that, as firms persistently improve upon their sales, profits and cash flows, economic growth in terms of wealth of a nation also improves.

It must be noted that manufacturing firms have tremendous roles to play in the achievement of economic growth ([Alvarez et al., 2021](#); [Erin et al., 2022](#)). For instance, once these firms start recording higher financial performance indicators, numerous employment opportunities will be available for the young ones and standard of living will be improved. Another point is that, a booming manufacturing industry ensures that more corporate taxes are paid to improve infrastructure in the economy. According to [Sierra García et al. \(2022\)](#) and [Sinha et al. \(2022\)](#), higher financial performance can be achieved if leadership of manufacturing organisations implements appropriate MAPs.

Notwithstanding the benefits that are associated with a thriving manufacturing sector ([Adu-Gyamfi & Chipwere, 2020](#)), firms in this sector are not doing well worldwide due to bad management practices and weak application of technology ([Fasesin et al., 2015](#); [Messner, 2016](#)). According to [Addo \(2017\)](#) and [Alhassan et al. \(2021\)](#), manufacturing firms in Ghana are recording abysmal performances year on year due to poor management practices, weak technology and intense competition from imported substitutes.

In line with the above challenges confronting the manufacturing sector in Ghana, it is not surprising that its contribution to Gross Domestic Product (GDP) has not been consistent over the years as can be seen in [Table 1](#) below.

Despite the fact that studies have been sighted on the effect of MAPs on financial performance of firms ([Senftlechner & Hiebl, 2015](#); [Mbawuni & Anerte, 2014](#); [Shahzadi et al., 2018](#); [Adu-Gyamfi & Chipwere, 2020](#)), most of the authors did not incorporate an important aspect of MAPs called Strategic Management Accounting Practices (SMAP) as recommended by [Ma et al. \(2022\)](#). It should be noted that [Ma et al. \(2022\)](#) is of the view that any future study on MAPs must include SMAP because it encourages firms to closely monitor what competitors are doing before taking decisions. Though [Akuma et al. \(2024\)](#) found a significant positive relationship between costing practices and financial performance (FP), the relationship between strategic management practices and FP was not significant. Based on this gap, this study will include SMAP as one of the dimensions of MAPs in the structural model.

Though the *institutional theory* suggests that relevant MAPs help to improve financial performance of firms ([Meyer & Rowan, 1977](#); [Burns & Scapens, 2000](#); [Alvarez et al., 2021](#)), the *contingency theory* argues that this can only be

Table 1. Contribution of Ghana's manufacturing sector to GDP.

Year	Percentage (%) to GDP
2000	9
2001	9
2002	9
2003	8.9
2004	8.7
2005	8.6
2006	9.7
2007	8.5
2008	7.5
2009	6.7
2010	6.3
2011	6.4
2012	5.6
2013	13.5
2014	11
2015	11
2016	10
2017	10
2018	10
2019	10
2020	10.9
2021	10.7

Source: World Development Indicators (2000 to 2021).

realised if the right internal and external conditions like the type of technology the firm adopts are in place (Fiedler, 1964). The resource based view (RBV) theory also holds the view that MAPs can only boost performance of firms if appropriate internal intangible resources like technology are deployed (Wernerfelt, 1986; Barney, 1991). For instance, while costing practices were found to have significant positive relationship with financial performance (FP), budgeting system (BS), decision support system (DSS), performance management system (PMS) and strategic management accounting practices (SMAP) were found not to have any significant relationship with FP (Akuma et al., 2024). There is therefore the need to test the moderating role of information technology in the connection between MAPs and FP as suggested by the contingency theory and RBV theory.

It should also be noted that, many studies are available on the direct relationship between information technology (IT) and financial performance (FP) of

firms (Gutiérrez & Teshima, 2018; Ankrah, 2019; Amoako et al., 2020; Seth & Xue, 2021), but these studies looked at IT as the availability of computers and computer softwares by firms. Researchers should look at how firms use technology to constantly interact with their customers, suppliers and other stakeholders (Ali et al., 2023). This is because the mere availability of computers without using them appropriately to engage stakeholders will not yield the desired effects. Besides, the moderating role of information technology integration (ITI) on the relationship between MAPs and financial performance of manufacturing firms as advocated by the contingency and RBV theories has not been given the required attention. Based on the contingency and RBV theories, this paper will test the moderating role of ITI practises of Ghanaian manufacturing firms on the connection between their MAPs and their financial performance.

2. Literature Review and Hypotheses Development

2.1. Theoretical Review

Management accounting (MA) has to do with regular analysis of financial and non-financial information like inflation rates, exchange rates, costing systems, qualification and track record of managers as well as activities of business competitors; where these analysis serve as guides in taking quality decisions (Pires et al., 2023). Such analyses help firms to implement good management accounting practices (MAPs) with the ultimate aim of boosting financial performance of firms.

According to the *institutional theory* of organisations, manufacturing institutions can be profitable if appropriate MAPs are implemented (Meyer & Rowan, 1977; Burns & Scapens, 2000). Though some scholars applied the institutional theory to prove that MAPs help firms to perform well (Ahmad et al., 2018; Ahinful & Touringana, 2019; Amir et al., 2020; Adu-Gyamfi & Chipwere, 2020; Afifa & Salah, 2022; Ogundajo & Nyikyaa, 2021), they neglected an important dimension of MAPs known as strategic management accounting practices (SMAP) which is a suggestion by Ma et al. (2022). Akuma et al. (2024) tried to deal with this gap but could not establish any connection between SMAP and financial performance (FP). Will information technology moderate the connection between MAPs and FP? This lacuna will be dealt with in this paper.

Notwithstanding the assertion by the *institutional theory* that MAPs help to enhance the financial success of firms (Meyer & Rowan, 1977; Burns & Scapens, 2000; Alvarez et al., 2021), the *contingency theory* wants leadership of firms to know that this can only be attained when the correct external and internal conditions like effective technology are in place (Fiedler, 1964). The *resource based view* (RBV) theory is in support of this theory by suggesting that MAPs can lead to better financial performance of firms only if relevant internal intangible resources like information technology systems are well adopted (Wernerfelt, 1986; Barney, 1991).

Though many scholars have investigated the direct connection between in-

formation technology and financial performance of firms (Gutiérrez & Teshima, 2018; Ankrah, 2019; Amoako et al., 2020; Seth & Xue, 2021), the moderating effect of information technology integration (ITI) on the connection between MAPs and financial performance of manufacturing firms as suggested by the contingency and RBV theories is not sighted in literature. This gap will also be dealt with in this study.

2.2. Empirical Review

Many scholars have looked at the impact of management accounting practices (MAPs) on financial performance (FP) of firms in different countries. For example, Vărzaru et al. (2022) established that financial performance of firms in Romania was better with firms that practised innovative MAPs as compared with those that concentrated on traditional costing systems. This is because innovative MAPs enable managers to have access to pool of qualitative and quantitative data the help them to take better decisions as compared to those that implemented basic costing techniques. This study however, did not cover strategic management accounting practices (SMAP) which is a dimension of MAPs that has been recommend Ma et al. (2022). With SMAP, managers are required to constantly assess every action taken by competitors before taking any business decision.

In a related article, though Gyamera et al. (2023) were able to prove that MAPs boosted the financial performance of firms in Ghana, they did not cover manufacturing sector which is considered as the engine of fast economic growth. The study also covered basic costing and budgeting techniques to the neglect of SMAP as suggested by Ma et al. (2022). Another paper by Adu-Gyamfi and Chipwere (2020) found that budgeting and costing techniques adopted by manufacturing companies in Ghana led to improved financial performance. This study has certain weaknesses. Though responses were obtained from 200 managers, the target population, sample size and sampling technique were not specified, hence it will be difficult for the study to be replicated. Another flaw is that, strategic management accounting practices (SMAP) as recommended by Ma et al. (2022) was not covered. According to Ma et al. (2022) contemporary studies on MAPs should include SMAP as one of the constructs.

The most recent paper sighted on MAPs and FP of firms was the one conducted by Akuma et al. (2024). Though the study included SMAP as one of the MAPs, its relationship with FP was found not to be significant. Could information technology play a useful moderating role in strengthening this relationship as suggested by the contingency and resource based view (RBV) theories? Based on this gap identified in literature, the impact of the following five sub-constructs of MAPs on the financial performance of manufacturing firms in Ghana will be investigated: strategic management accounting practices (SMAP), performance management systems (PMS), decision support systems (DSS), budgeting systems (BS), and costing systems (CS). The paper will then go ahead to test the mod-

erating role of information technology integration in the connection between MAPs and FP as suggested by the contingency and RBV theories. Thus the first five hypotheses to be tested in this paper are as follows:

H₁: Budgeting system (BS) has a significant positive impact on the financial performance (FP) of manufacturing firms in Ghana.

H₂: Costing system (BS) has a significant positive impact on the financial performance (FP) of manufacturing firms in Ghana.

H₃: Decision support system (DSS) has a significant positive impact on the financial performance (FP) of manufacturing firms in Ghana.

H₄: Performance management system (PMS) has a significant positive impact on the financial performance (FP) of manufacturing firms in Ghana.

H₅: Strategic management accounting practices (SMAP) has a significant positive impact on the financial performance (FP) of manufacturing firms in Ghana.

According to [Moori et al. \(2018\)](#) incorporating information technology (IT) into the daily operations of firms will help them to attend to the needs of their stakeholders on timely basis and this can help improve upon their year on year profits. Several studies have established a significant positive relationship between information technology and performance of firms ([Hadi et al., 2023](#); [Li et al., 2023](#); [Bokhari & Manzoor, 2022](#); [Avecillas et al., 2023](#); [Li et al., 2022](#)). These studies however, look at IT in a narrow sense. They just look at whether the firms have purchased modern computers as well as whether their employees are computer literates. [Hussain et al. \(2023\)](#) are of the view that academic scholars should look at IT in terms of how firms use information technology systems to interact continuously with their suppliers, customers and other stakeholders.

The *contingency theory* argues that MAPs will improve the performance of firms only if these firms have effective information systems in place ([Fiedler, 1964](#)). The *resource based view* (RBV) theory is in support of this theory by arguing that MAPs can lead to better performance only if relevant internal intangible resources like technology is well deployed ([Wernerfelt, 1986](#); [Barney, 1991](#)). One study that tried to test the proposal put forward by these theories is the one conducted by [Gyamera et al. \(2023\)](#), which found that, firms that invested more in IT were more profitable than those that invested less in IT. This study also found significant moderating role of IT in the connection between MAPs and financial performance of firms.

A lacuna that has been identified in this paper is the narrow definition of IT in terms of availability of modern computers and the level of computer literacy of the firms' employees. Meanwhile, researchers are encouraged to focus on information technology integration of firms, which is finding out whether firms use information systems like softwares and whatsapp platforms to interact with suppliers, customers and other stakeholders on regular basis ([Ruzo-Sanmartín et al., 2024](#); [Hussain et al., 2023](#)). The authors also focused on selection of firms that are into trading, provision of services and manufacturing. This implies that the

findings are not specific to manufacturing firms in Ghana.

To fill these gaps, this study will investigate the moderating role of information technology integration in the connection between management accounting practices and financial performance of manufacturing firms in Ghana as recommended by the *contingency theory* and the *RBV theory*. Thus, the next five hypotheses are as follows:

H₆: Information Technology Integration (ITI) plays a significant moderating role in the connection between Budgeting System (BS) and Financial Performance (FP) of manufacturing firms in Ghana.

H₇: Information Technology Integration (ITI) plays a significant moderating role in the connection between Costing System (CS) and Financial Performance (FP) of manufacturing firms in Ghana.

H₈: Information Technology Integration (ITI) plays a significant moderating role in the connection between Decision Support System (DSS) and Financial Performance (FP) of manufacturing firms in Ghana.

H₉: Information Technology Integration (ITI) plays a significant moderating role in the connection between Performance Management System (PMS) and Financial Performance (FP) of manufacturing firms in Ghana.

H₁₀: Information Technology Integration (ITI) plays a significant moderating role in the connection between Strategic Management Accounting Practices (SMAP) and Financial Performance (FP) of manufacturing firms in Ghana.

2.3. Conceptual Framework

Figure 1 below shows the conceptual framework of the hypotheses to be tested.

3. Methodology

3.1. Population, Sample and Data Collection

This research adopted the cross-sectional survey design using all the 634 manufacturing firms that are registered with the Association of Ghana Industries (AGI) as at 2022 as the population. These firms were classified in relation to what they produce. AGI is chosen as the target population because of its visibility in Ghana. It is regularly consulted by state agencies to discuss issues that relate to the manufacturing sector. For instance, in October 2022, the president of the republic of Ghana and his finance minister met with the leadership of AGI to brainstorm on how the manufacturing sector can be supported to produce certain goods locally in order to strengthen the value of the cedi against the convertible currencies. Secondly, AGI is the only body representing manufacturing firms in Ghana that has a representation on the board of the Public Utilities Regulatory Commission (PURC). Besides, it is a well-established association made up of small, medium and large firms scattered across all the regions in Ghana. These include Kinapharma Limited, Latex Foam Rubber Products

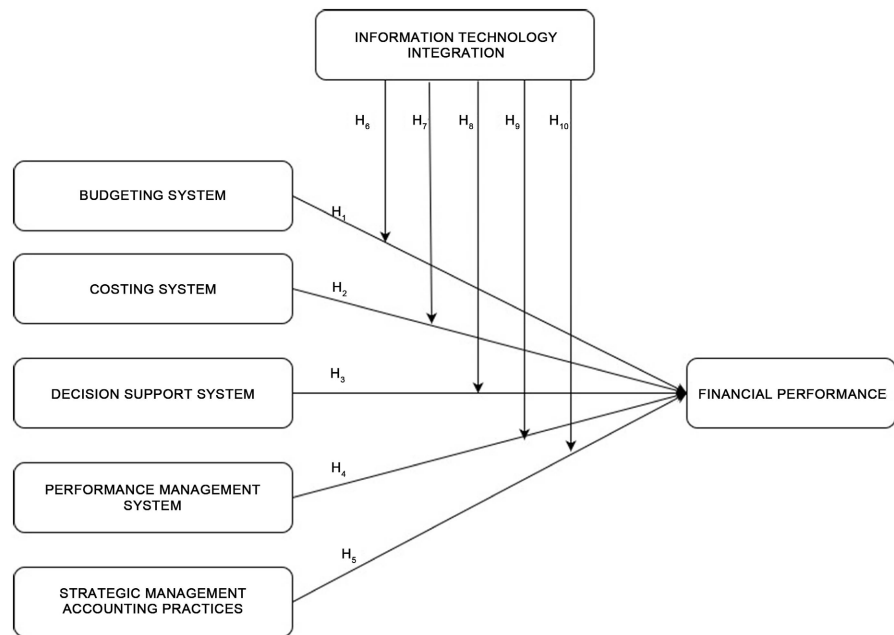


Figure 1. Detailed conceptual framework on the independent and dependent variables. Source: Field Survey (2023).

Limited, M & G Pharmaceuticals Limited, Guinness Ghana Breweries Limited, Graphic Communications Group Limited, Accra Breweries, Aluworks Limited, Electricity Company of Ghana, Fan Milk Limited, Gihoc Distilleries Company Limited, Ghana Rubber Estates Limited, Ernest Chemist Limited and Kasapreko Company Limited.

Using the sample size determination table developed by [Krejcie and Morgan \(1970\)](#), the minimum required sample size for the study is 242. To achieve this target, the researchers distributed 269 questionnaires in google forms on pro-rata basis using the stratified and simple random sampling techniques. 266 responses were retrieved representing a response rate of 98.8%. A manager from each company completed one set of questionnaire. **Table 2** below shows details of the sample used for the analysis.

3.2. Instrument and Measurement of Variables

The authors relied on a five-point Likert scale to gather responses from managers of the firms. These are: 1 = Not at all; 2 = Least agree; 3 = Agree; 4 = Strongly agree and 5 = Very strongly agree.

The instrument for MAPs is adapted from an instrument developed by [Burrirt et al. \(2010\)](#), who built on the earlier work of [Jasch and Savage \(2008\)](#) and [Christ and Burrirt \(2015\)](#). The financial performance (FP) scale was adapted from an instrument developed by [Kohli and Jaworski \(1990\)](#). Information technology integration with business strategy is adapted from [Bharadwaj et al. \(1999\)](#), [Tippins and Sohi \(2003\)](#) and [Kmieciak et al. \(2012\)](#). [Amoako et al. \(2020\)](#) successfully used this scale to publish a paper in Emerald with a reported composite reliability (CR) of 0.817 and an average variance extracted (AVE) of 0.531.

Table 2. Sample size.

Manufacturing Industry	Number of respondents	Percentage
Furniture producing firms	26	9.8%
Food and beverage-producing firms	48	18%
Drugs and pharmaceutical-producing firms	22	8.3%
Chemicals producing firms	14	5.3%
Building and construction firms	40	15%
Clothing and textiles-producing firms	9	3.4%
Toiletries and cosmetics-producing firms	30	11.3%
Electrical and electronic firms	38	14.3%
Energy producing firms	6	2.3%
Printing and packaging firms	20	7.5%
Other manufacturing firms	13	4.8%
TOTAL	266	100%

Source: Field Survey (2022).

3.3. Data Analyses

Smart Partial Least Square-Structural Equation Modeling (PLS-SEM) version 4 was used to analyse the data. Structural equation modeling (SEM) is a multivariate data analysis technique for examining intricate interactions among indicators. Researchers typically use two methods to estimate structural equation models: covariance-based SEM (CB-SEM) and partial least squares SEM (PLS-SEM). While the CB-SEM is primarily used for validation purposes, PLS-SEM is a second generation technique of multivariate method that can be used to test the hypotheses of existing theories and concepts. The Smart PLS-SEM focuses on the predictive ability of the model by explaining the variance in the independent variables.

The Smart PLS-SEM technique was used because it has several benefits over earlier softwares like Statistical Package for the Social Sciences (SPSS) and Stata (Hair et al., 2019). For instance, it is appropriate to use this technique to predict target constructs when the structured model is complex. It can also be used even when the research data is non-normally distributed. It also favours model parsimony because it is very simple to use and understand (Hair et al., 2019). It also provides the output in nice graphs which appeal to the eyes and this enhances quick understanding. Besides, this technique makes it easy to copy and paste tables in the research paper. It must be noted that, most of the published accounting and finance papers that were sighted used Stata for the analysis. Stata does not produce nice graphs and this affects quick understanding by readers. Again, the use of Stata does not permit the researcher to copy and paste tables and graphs. The researcher has to create the tables himself.

4. Results and Findings

4.1. Evaluation of the Structural Model

Indicators that met the required threshold of 0.7 were used for the evaluation (Hair et al., 2019; Hair Jr. et al., 2020). These are shown in **Figure 2** below.

4.2. Internal Consistency and Convergent Validity

Cronbach's alpha and composite reliability were analysed to check the survey's internal consistency reliability. This looks at the consistency of the results delivered in the survey, ensuring that the various items measuring the different constructs deliver consistent scores. According to Hair Jr. et al. (2021), a Cronbach's alpha and composite reliability threshold of 0.7 is acceptable. From **Table 3** below, the internal consistency reliability is adequate.

Convergent validity was assessed to ensure that the new scale correlates well with the variables. The concept should have a positive correlation with similar variables and a negative correlation with unrelated ones (Gignac, 2021). As shown in **Table 3** below, all the AVE values are greater than 0.5, proving that convergent validity has been met (Hair Jr. et al., 2021).

4.3. Discriminant Validity

Discriminant validity tests are done to ensure that constructs that should have no relationship do, in fact, not have any relationship. According to Henseler et al. (2015), the Heterotrait-Monotrait (HTMT) ratio should be less than 0.90 to suggest adequate discriminant validity. As seen in **Table 4** below, the HTMT is adequate.

4.4. Multicollinearity

Multicollinearity arises when two or more independent variables are highly correlated in a model. When this happens, the independent variables may lead to misleading findings (Hair et al., 2011). This problem may exist if the Variance Inflation Factor (VIF) is more than 5 (Hair et al., 2011; Wong, 2013). From **Table 5** below, there is no multicollinearity problem in the model since all the VIF values are less than 5.

4.5. Significance of the Path Coefficients

When assuming a significant level of 5%, the p values must be smaller than 0.05 to conclude that the relationship under consideration is significant (Hair et al., 2011). However, when assuming a significant level of 1%, the p values must be less than 0.01 to indicate that a relationship is significant. From **Table 6** below, the path coefficient between CS and FP ($\beta = 0.439$, $t = 6.023$, $p < 0.01$) is positively significant. Thus hypothesis 2 is supported, implying that, the more the manufacturing firms practice their costing systems the better their profitability. However, the path coefficients between BS and FP ($\beta = 0.167$, $t = 1.705$,

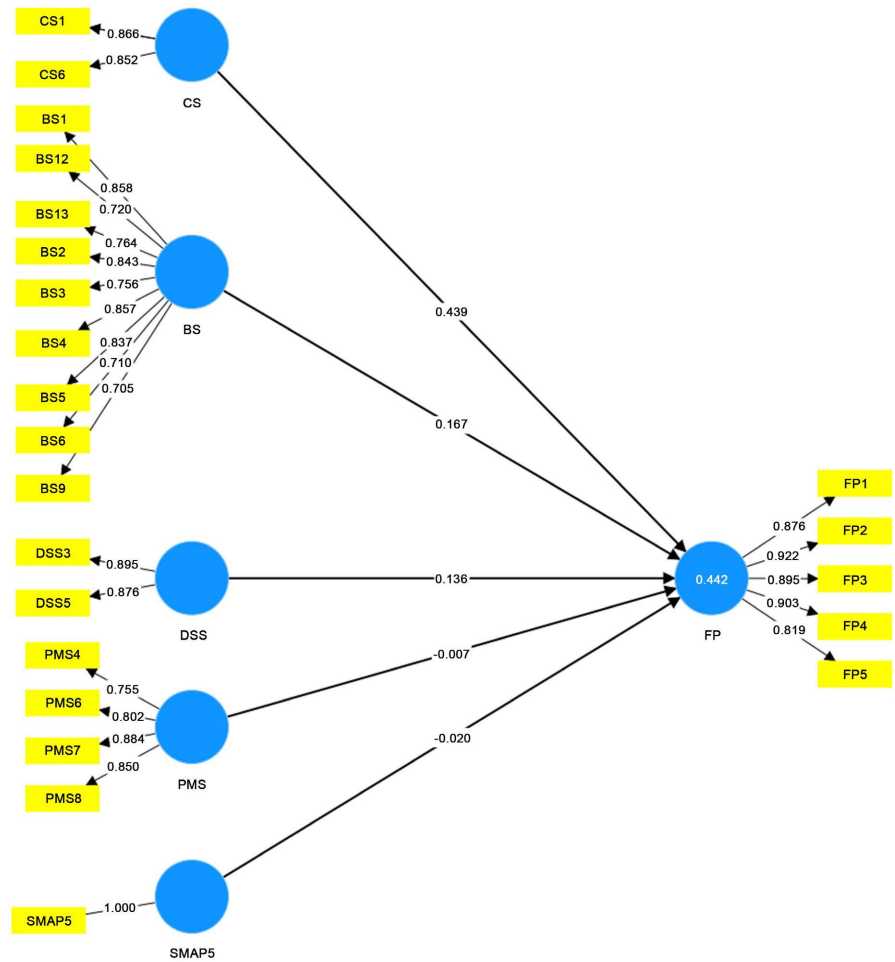


Figure 2. Structural model. Source: Field Survey (2023).

Table 3. Internal consistency and convergent validity.

Items	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
BS	0.922	0.934	0.935	0.617
CS	0.819	0.831	0.891	0.732
DSS	0.725	0.728	0.879	0.784
FP	0.930	0.931	0.947	0.781
PMS	0.842	0.857	0.894	0.679

Source: Field Survey (2023).

Table 4. Heterotrait-Monotrait Ratio (HTMT).

	BS	CS	DSS	FP	PMS
BS					
CS	0.897				

Continued

DSS	0.860	0.868			
FP	0.621	0.730	0.648		
PMS	0.821	0.736	0.897	0.522	
SMAP	0.712	0.683	0.737	0.461	0.697

Source: Field Survey (2023).

Table 5. Multicollinearity assessment (Inner VIF).

	VIF
BS -> FP	3.672
CS -> FP	2.863
DSS -> FP	2.553
PMS -> FP	2.571
SMAP -> FP	2.147

Source: Field Survey (2023).

Table 6. Significance of the path coefficients of the relationship between MAPs and FP.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Comment
BS -> FP	0.167	0.174	0.098	1.705	0.088	Not significant
CS -> FP	0.439	0.442	0.073	6.023	0.000	Significant
DSS -> FP	0.136	0.135	0.099	1.370	0.171	Not significant
PMS -> FP	-0.007	-0.013	0.104	0.065	0.948	Not significant
SMAP -> FP	-0.020	-0.023	0.080	0.248	0.804	Not significant

Source: Field Survey (2023).

$p = 0.088$), DSS and FP ($\beta = 0.136$, $t = 1.370$, $p = 0.171$), PMS and FP ($\beta = -0.007$, $t = 0.065$, $p = 0.948$) and between SMAP and FP ($\beta = -0.020$, $t = 0.248$, $p = 0.804$) are not significant. Thus, hypotheses 1, 3, 4 and 5 are not supported.

4.6. Coefficient of Determination (R^2)

This is the proportion of variation in the dependent variable that is predicted by the model. According to Chin (1998), R^2 values of 0.67, 0.33 and 0.19 are substantial, moderate and weak respectively. Based on this criterion, it can be observed from Table 7 below that 44.2% variation in FP is predicted by the model and this represents moderate predicting accuracy.

4.7. Effect Size (f^2)

This assessment allows the researcher to observe the effect of each independent variable on the dependent variable. According to Cohen (1992), f^2 with values 0.02, 0.15 and 0.35 represent small effect, medium effect and large effect respectively.

Table 7. Coefficient of determination (R^2).

Constructs	R Square	R Square Adjusted
FP	0.442	0.431

Source: Field survey (2023).

A value that is less than 0.02 indicates that there is no effect of the independent variable on the dependent variable. From **Table 8** below, if BS ($f^2 = 0.014$), DSS ($f^2 = 0.013$), PMS ($f^2 = 0.000$) and SMAP ($f^2 = 0.000$) are omitted from FP, there will be no effect. If CS ($f^2 = 0.121$) is omitted from FP, it will have a small effect.

4.8. Predictive Relevance (Q^2)

The **predictive relevance (Q^2)** of the model was examined using Stone-Geisser's Q^2 value (Geisser, 1975; Stone, 1974). This measure is an indicator of the model's predictive power. A Q^2 value that is larger than zero suggests that the model has predictive relevance for a certain dependent variable. In contrast, values of zero and below indicate lack of predictive relevance. From **Table 9** below, the model used in this study has predictive relevance since the Q^2 value is more than zero.

4.9. Goodness-of-Fit Test

According to Hair Jr. et al. (2016), the Standardized Root Mean square Residual (SRMR) and Normal Fit Index (NFI) should have a threshold of between 0 and 1 to suggest an adequate model fit. The closer they are to 1, the better the model fit. As can be seen from **Table 10** below, The SRMR and the NFI results show that the model is fit.

4.10. Common Method Bias (CMB)

According to Hair Jr. et al. (2021), CMB is the variance that is attributable to the measurement method rather than to the construct that the measures represent. Kock (2020) recommends the use of Harman's 1976 single factor score to test for CMB, in which all items assessing the latent variables are loaded into one common factor. If the total variance for a single factor is less than 50%, it suggests that CMB does not affect the data and hence the results. This study used Statistical Package for the Social Sciences (SPSS) version 24 to analyse possible CMB in the research instrument and this produced Herman's single factor score of 39.656%. Since this is below 50%, there is a very low probability that CMB will affect the results of the study (Tehseen et al., 2017).

CMB can also be assessed by looking at the collinearity among the latent variables through Variance Inflated Factor (VIF). VIF greater than or equal to 5 indicates a potentially collinearity problem (Hair et al., 2011). Moreover, VIF greater than or equal to 3 indicates a potential collinearity problem (Diamantopoulos & Sigauw, 2006). The results presented in **Table 5** revealed that all the values are below 3 and 5 therefore the model does not have collinearity problem. Consequently, the model is free from common method bias (Kock, 2015).

Table 8. Effect size.

	FP
BS	0.014
CS	0.121
DSS	0.013
PMS	0.000
SMAP	0.000

Source: Field Survey (2023).

Table 9. Predictive relevance.

	Q ² Predict
FP	0.405

Source: Field Survey (2023).

Table 10. Goodness-of-fit.

	Saturated model	Estimated model
SRMR	0.058	0.058
d_ULS	0.996	0.996
d_G	0.689	0.689
Chi-square	1010.833	1010.833
NFI	0.801	0.801

Source: Field Survey (2023).

4.11. Findings on Moderating Role of Information Technology Integration (ITI) in the Connection between Management Accounting Practices (MAPs) and Financial Performance (FP)

Figure 3 below shows the structural model of the moderating role of ITI in the link between MAPs and FP.

1) Significance of moderation effect of ITI on the link between MAPs and FP

The path coefficient of the moderating model was assessed to establish the strength of the moderating role of ITI on the relationship between MAPs and FP. This study adopted the path coefficient criterion of [Hair et al. \(2011\)](#) where it is stated that a path coefficient close to one indicates a strong positive relationship while a path coefficient close to negative one indicates a strong negative relationship. On the other hand, a path coefficient close to zero indicates a weak relationship. It should be noted that a very low path coefficient value close to zero generally is not statistically significant.

It can be observed from **Table 11** below that ITI has a negative but moderately weak moderating effect ($MOD_BS_FP = -0.087$) on the connection between BS

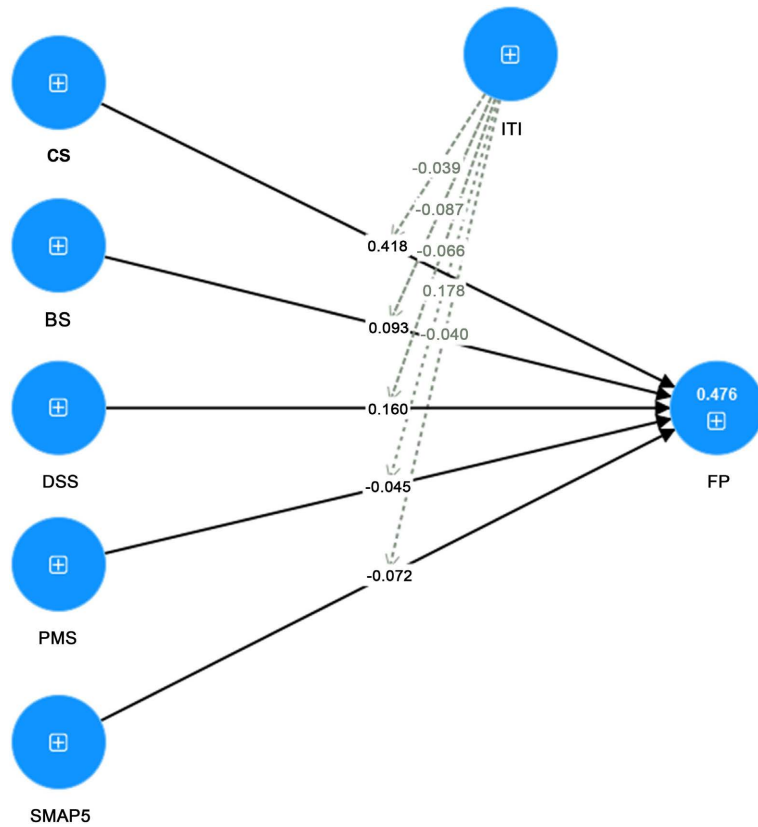


Figure 3. Moderating model of the role of ITI in the link between MAPs and FP. Source: Field Survey (2023).

Table 11. Significance of moderation effect of ITI on the link between MAPs and FP.

	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	p Values
MOD_BS_FP -> FP	-0.087	0.092	0.949	0.343
MOD_CS_FP -> FP	-0.039	0.082	0.471	0.638
MOD_DSS_FP -> FP	-0.066	0.086	0.769	0.442
MOD_PMS_FP -> FP	0.178	0.085	2.089	0.037
MOD_SMAP_FP -> FP	-0.040	0.070	0.560	0.575

Source: Field Survey (2023).

and FP. ITI has a negative but moderately weak moderating effect (MOD_CS_FP = -0.039) on the connection between CS and FP. ITI has a negative but moderately weak moderating effect (MOD_DSS_FP = -0.066) on the connection between DSS and FP. ITI has a positive but moderately strong moderating effect (MOD_PMS_SP = 0.178) on the connection between PMS and FP. ITI has a negative but moderately weak moderating effect (MOD_SMAP_FP = 0.040) on the connection between SMAP and FP.

To assess whether the path coefficient of the moderation effect of ITI is sig-

nificant or not depends on its standard error that is obtained by bootstrapping, to enable the computation of empirical t values and p values for all structural path coefficients. To conclude that the association under investigation is significant at a significant level of 5%, the p values must be lower than 0.05 (Hair et al., 2011). However, at 1% significant level, the p values must be less than 0.01.

From **Table 11** above, there is a significant moderating effect of ITI ($\beta = 0.178$, $t = 2.089$, $p < 0.05$) on the connection between PMS and FP. Thus, hypothesis 9 is supported. There is however, no significant moderating effect of ITI ($\beta = -0.087$, $t = 0.949$, $p = 0.343$) on the connection between BS and FP. There is no significant moderating effect of ITI ($\beta = -0.039$, $t = 0.471$, $p = 0.638$) on the connection between CS and FP. There is no significant moderating effect of ITI ($\beta = -0.066$, $t = 0.769$, $p = 0.442$) on the connection between DSS and FP. There is no significant moderating effect of ITI ($\beta = -0.040$, $t = 0.560$, $p = 0.575$) on the connection between SMAP and FP. Thus, hypotheses 6, 7, 8 and 10 have not been supported.

2) Effect size (f^2) of information technology integration (ITI) on the link between MAPs and FP

The effect size (f^2) of ITI on the link between MAPs and FP was assessed. This study reviewed Cohen (1992) guidelines for assessing f^2 with values 0.02, 0.15 and 0.35 representing small effect, medium effect and large effect respectively. A value that is less than 0.02 indicates no effect of the moderating variable on the dependent variable. However, Kenny and Judd (2019) and Hair Jr. et al. (2021), after looking at the effect size of several published articles observed that average effect size for moderating effects is just 0.009 and this violates the reported standard in Cohen (1992). These authors therefore recommended effect size of moderating effect of 0.005, 0.01 and 0.025 for small effect, medium effect and large effect respectively. Their justification is that when analysing effect size of moderation effect, the researcher is just dealing with a minute side of the structural model, hence these lower thresholds make reasonable sense. This study therefore adopted the standards of effect size prescribed by Kenny and Judd (2019) and Hair Jr. et al. (2021).

From **Table 12** below, the effect size (f^2) shows a small moderating effect of ITI ($f^2 = 0.007$) on the relationship between BS and FP. There is no moderating effect of ITI ($f^2 = 0.001$) on the relationship between CS and FP. There is a small moderating effect of ITI ($f^2 = 0.005$) on the relationship between DSS and FP. There is a large moderating effect of ITI ($f^2 = 0.028$) on the relationship between PMS and FP. Finally, there is a no moderating effect of ITI ($f^2 = 0.002$) on the relationship between SMAP and FP.

5. Discussion of Findings

5.1. Management Accounting Practices (MAPs) and Financial Performance (FP)

From **Table 6**, the path coefficient between costing systems (CS) and financial

Table 12. Effect size of ITI on the link between MAPs and FP.

	FP
MOD_BS_FP	0.007
MOD_CS_FP	0.001
MOD_DSS_FP	0.005
MOD_PMS_FP	0.028
MOD_SMAP_FP	0.002

Source: Field Survey (2023).

performance (FP) was found to be positive, consistent with expectation and the p -value of this relationship was found to be significant at 1%. The second hypothesis of this paper is therefore confirmed. This confirms the institutional theory of organizations, which argues that, MAPs of firms have impact on their financial performance.

The explanation is that, the costing systems (CS) in place at the manufacturing firms caused their financial performance (FP) to improve. This means that, Ghanaian manufacturing firms continuously engage in job costing and variable costing which help them to minimise their cost of operations. These cost control measures help the firms to improve upon their sales, profits and cash flows. This finding is consistent with an earlier study by [Adu-Gyamfi and Chipwere \(2020\)](#) in Ghana, where the authors found that costing systems of listed manufacturing firms have significant positive relationship with their financial performance. Similarly, this finding agreed in a way with the result of a study conducted by [Alvarez et al. \(2021\)](#), where the authors found out that costing systems of hotels in Argentina helped to boost their financial performance. This study however, relied too much on descriptive statistics to arrive at the conclusions.

However, [Imo and Chukwu \(2022\)](#) demonstrated that, medium and large scale companies that use costing system recorded similar improved financial performance as those who do not have any particular costing systems in place. This implies that other factors might have contributed to the improved performance and not necessarily their costing system. Again, focusing on hotels in Greece, [Diavastis et al. \(2016\)](#) were able to establish that costing systems alone do not have significant relationship with financial performance, but appropriate costing systems interact with accounting information system to enhance financial performance. Last but not least, this finding confirms a study [Akuma et al. \(2024\)](#) which found a significant positive relationship between costing practices of firms and their financial performance. The implication is that firms who want to boost their sales, profits and cash flows must adopt appropriate measures to minimise their production cost. Such measures include buying in bulk direct from the producer to enjoy trade discount as well engaging in just-in-time production so that that raw materials purchased will be used instantly in order not to incur storing cost. Another implication is that, firms should in the short term

focus on variable costing instead of absorption costing to improve their profitability. When assessing the profitability of producing a product, the focus should be on the direct cost of raw materials, labour and overhead where fixed cost will be taken care of in the long run. This study however, did not establish any significant relationship between BS and FP, DSS and FP, PMS and FP as well as SMAP and FP.

5.2. Moderating Role of Information Technology Integration (ITI) on the Connection between Management Accounting Practices (MAPs) and Financial Performance (FP)

It can be observed from **Table 11** that, ITI has a positive significant moderating effect on the relationship between Performance Management Systems (PMS) and Financial Performance (FP), consistent with expectation and the p-value of the relationship ($\beta = 0.178$, $t = 2.089$, $p < 0.05$) was found to be significant at 5%. Hypothesis 9 of this study is therefore confirmed. This implies that, manufacturing firms in Ghana use ITI tools like software applications, electronic mails and whatzup platforms to constantly link up with their customers, suppliers and other industry players. They at the same time implement performance management practices like ratio analysis and taking record of reasons why customers leave the firms or absent themselves from work. The simultaneous implementation of ITI systems and PMS has helped to improve the sales, profits and cash flows of manufacturing firms in Ghana. This implies that, ITI positively and significantly strengthens the connection between PMS and FP. Alternatively, we can say that the ITI practices of the firms helped to strengthen the link between their PMS and their FP, in terms of higher sales and profitability. This finding is in support of the contingency and resource based view (RBV) theories which suggest that, MAPs can only boost the performance of firms when appropriate information technology systems are in place.

Though several studies exist on the direct impact of information technology (IT) systems on performance of firms (Gutiérrez & Teshima, 2018; Ankrah, 2019; Amoako et al., 2020; Seth & Xue, 2021; Gyamera et al., 2023), a study on the moderating role of ITI on the connection between PMS and FP has not been sighted. For instance, though this finding supports Gyamera et al. (2023) who found a significant positive impact of information technology on the performance of firms in Ghana, this finding goes further to prove that ITI can play a huge moderating impact in the management accounting practices and financial performance nexus. This finding is a gap that has been filled in literature. The study however, did not find any significant moderating role of ITI in the connection between CS and FP, BS and FP, SMAP and FP as well as DSS and FP.

6. Conclusions

6.1. Implications for Research

The findings of the study have a lot of methodological and theoretical contribu-

tions to offer. In terms of theory or knowledge, the findings have extended the literature of institutional, contingency and resource based view theories. For instance, the institutional theory made it possible to establish the fact that Management Accounting Practices (MAPs) like costing systems of manufacturing firms in Ghana will help to enhance the financial performance (FP) of these firms. Secondly, the contingency and resource based view theories have been effectively used to prove the point that appropriate information technology integration (ITI) systems help to strengthen the connection between MAPS like performance management systems (PMS) and FP. These valuable ideas from the theories have been verified into a conceptual framework in **Figure 1**. This implies that future researchers on management accounting should read and find different dimensions of information technology (IT) systems and how these can strengthen the connection between MAPs and financial performance of firms.

In terms of methodological contribution, the study has a lot to offer. In the first place, Association of Ghana Industries (AGI) offers ideal and well represented population of manufacturing firms in Ghana. This is because, AGI has a pool of manufacturing firms that spread across all the regions of Ghana. Some of the manufacturing firms are small, medium and large. AGI also has a representative on the board of the Public Utilities and Regulatory Commission (PURC) and the government of Ghana always consults them before taking any decision that affects their members. This ensures that findings can be generalised to all manufacturing firms in Ghana. Thus researchers who want to conduct a study on manufacturing firms in Ghana should focus on those that are registered with AGI as the target population. The findings of this study should also encourage academic scholars to use Smart PLS-SEM to analyse studies on manufacturing firms since it can be used to analyse both normal and non-normal data. It is also very easy to use.

6.2. Implications for Management

The findings of the study also have some managerial contributions to top level management as well as the board of manufacturing firms. In order to boost their financial performance (FP), they must implement systems (CS) like variable costing and job costing, performance management systems (PMS) like ratio analysis and keeping of records on why employees leave the firm or absent themselves from work as well as engage in information technology integration (ITI) practices like using softwares and social media platforms to constantly get in touch with the stakeholders. This is because, ITI helps to strengthen the connection between PMS and FP. Leaders of these firms must also come out with a policy to regularly train their staff on these CS, PMS and ITI practices for them to put these into practice in order to enhance their FP.

6.3. Implications for Practice

The findings also have some practical contributions to offer. The Institute of Chartered Accountants-Ghana, which is the body that is responsible for training

professional accountants in Ghana as well as issuing auditing firms in Ghana with practising licence should put costing systems (CS), performance management systems (PMS) and information technology integration (ITI) systems in their syllabus and set examination questions on them. This will help auditors to advise their clients to implement these systems at their work places since these will boost their financial performance. These measures will ensure that manufacturing firms in Ghana survive as going concerns.

7. Limitations of the Study

This research used quantitative techniques, but qualitative approach may present a different picture. Another drawback is that the study adopted the cross-sectional survey to collect data at one point in time so the conclusions might not reflect the firms' future conditions. However, the relevance of studying the moderating role of ITI in the connection between MAPs and FP has been stressed in this study. The findings with the limitations should pave way for further research in this area.

8. Suggestions for Future Research

This study gathered data from respondents at one point in time. Future research should therefore, collect data at more than one point in time to capture changes that may occur over time. This will help the researcher to compare findings from different time periods. Scholars should also conduct similar studies in different countries or industries to validate and compare the findings, broadening the knowledge in application of information technology and management accounting practices in different environments. Future researchers should also integrate qualitative data through interviews or case studies with executives and accounting managers to gain deeper insights into the challenges and opportunities of ITI in management accounting. This mixed-methods approach could uncover more nuanced understandings of the strategic decision-making processes within firms. Again, similar studies should be replicated in different countries or industries to validate and compare the findings to deepen the understanding of the topic.

Data Availability Statement

The corresponding author will provide the research data upon reasonable request.

Authors' Contributions

All the authors designed the research, collected the research data, performed the analysis as well as did proof-reading. They all met to effect the corrections that were requested from the reviewers and the editorial board.

Conflicts of Interest

The authors declare that they have no conflicts of interest with regards to the

publication of this paper.

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