

Mediating Role of Outsourcing on The Relationship Between Lean Manufacturing Practices and Profitability

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Abstract

Profitability of manufacturing firms is a key component determining their performance in an intensive dynamic manufacturing industry. Mergers, takeovers and collaborations are on the increase because of collapsing firms attributed to declining profits. Whereas strategic efforts have been made through collaborative research involving industry stakeholders and scholars, strategies directly influencing profitability have been discovered. However, profit decline still persists. Accordingly, restless researchers are still struggling to find amicable strategies to ensure the profitability of manufacturing firms. It is on this notch that this paper weighs in by considering the mediating role of outsourcing on lean manufacturing practices and profitability. Whereas previous scholars have used these factors directly to determine their impact on firms' profitability, less attention was paid to the mediation effect. Hence, this paper contributes by bridging the gap. A sample of 82 manufacturing firms in Uganda was involved based on a cross-sectional research design to determine this interactive relationship. Additionally, widely used Sobel tests in the Med-Graph Excel programme following Baron and Kenny's mediation approach were adopted to test the mediation effect. The findings proved that outsourcing significantly mediated the relationship between lean manufacturing practices and the profitability of manufacturing firms (Sobel Z-value = 2.562, $p = 0.010$).

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Introduction

Whereas mediation studies are increasingly surfacing in the business research field, little is known about mediation effects enhancing the profitability of manufacturing firms. This paper narrows the gap by investigating the mediating role of outsourcing on lean manufacturing practices and profitability using selected manufacturing firms in Uganda. Profitability is a pivotal point for manufacturing firms determining their competitive survival in an intense manufacturing industry (Fullerton and Wempe, 2009). This notch is supported by reports showing that lean manufacturing practices are positively associated with profitability (Callen et al., 2003), while other studies revealed that firms' financial performance is likely to improve when the right outsourcing decision is made (Heshmati, 2003). Accordingly, this paper endeavours to investigate the interactive effect of outsourcing and lean manufacturing practices on firms' profitability. This paper is structured under specific headings including abstract, introduction, literature review and hypothesis development, methodology, results and discussions, conclusion, and references.

Literature review and hypothesis development

Rising studies demonstrate that mediation effects empirically inform researchers how factors interact to mitigate a problem (MacKinnon et al., 2002, Hayes, 2009, Baron and Kenny, 1986). Despite this motivation, little is known about the mediating role of outsourcing in firms' profitability in the manufacturing industry. Outsourcing is concerned with seeking external services from experts of previously in-house performed activities through different forms including contracting (Heshmati, 2003). Considering the economic returns view, outsourcing aims at transaction cost reduction for outsourced activities (Stringfellow et al., 2008). Accordingly, manufacturing firms are adopting this strategy for cost cost-saving motives to enhance profitability (Holcomb and Hitt, 2007). Reports show that outsourcing is a viable strategy adopted globally to exploit production differentials and save labour costs (Abraham and Taylor, 1996, Fixler and Siegel, 1999). Retrospectively, Görg and Hanley (2004) posed the question of whether firms undertaking outsourcing have enhanced higher profitability. Such a question has motivated scholars to traverse carefully in establishing outsourcing implications. This is evidenced by vertical mergers aimed at reducing transaction costs facing manufacturing firms. Meanwhile, firms are trapped between buying or making decision-making brackets as they look for viable strategies to boost profitability through cost savings (Görg and Hanley, 2004, Grossman and Helpman, 2002). Particular reports revealed that outsourcing has played a crucial role in the United States (US) economic development with manufacturing firms at the forefront in cost saving through its widely known offshoring services from China and Mexico (Viotor and Veytsman, 2005). However, as the trend increases, the influence of outsourcing on profitability depends on firm size (Görg and Hanley, 2004, Görg and Stephan, 2002).

As the struggle to safeguard the profits of manufacturing continue, other scholars are proposing lean manufacturing practices as key player (Mostafa and Dumrak, 2013, Fullerton and Wempe, 2009). Lean manufacturing that successfully changed mass production in the automobile industry has awakened the manufacturing industry to rethink eliminating repetitive processes costing firms (Holweg, 2007). Since lean conception by Toyota Company, it has guided manufacturers in reducing inventory levels to required amounts that have continuously reduced stock holding costs

encroaching on firms' profits (Fullerton and Wempe, 2009). This notion is supported by remarkable findings noting that lean practices have emerged from a learning process that mitigates dynamic environmental contingencies (Fujimoto, 1999). These are lean practices behind the superior performance of manufacturing firms that can be copied to other sectors globally (Holweg, 2007). Eliminating wasteful activities consuming company resources without value addition is important in saving company profits (Goldsby et al., 2006). Interestingly, embracing lean practices systematically improves firms' performance and enables competitiveness in a turbulent environment. For example, lean manufacturing practices have enhanced the profitability of manufacturing firms in the past decades (Mwelu et al., 2014). Despite positive recommendations by previous scholars, lean practices' awareness is lagging behind (Holweg, 2007). There is a need to increase awareness so that managers are able to explore the positive contribution of lean manufacturing practices to ensure firms' profitability.

It is globally known that customers are the source of firms' profits. Despite this recognition, firms are persistently challenged by demand for quality products to satisfy customers. Lean manufacturing practices aim to meet customer demands by avoiding the "Muda" of goods and services (Womack and Jones, 2013). Satisfying customers in an intensely competitive environment has left managers of manufacturing firms to innovatively design strategies to sustain profitability. Innovations have led to the inception of hybrid strategies spanning the manufacturing industry to address firms' challenges. For example, the Leagile integrated model is a combination of lean and agile strategies established to address challenges in supply chain management (Christopher and Towill, 2001, Mostafa and Dumrak, 2013). Additional mixed models based on Pareto (20-80) % rule are adopted for the manufacturing industry as a strategy addressing a range of products on production lines to translate firms' efficiency (Goldsby and García-Dastugue, 2003). Despite these innovative models rolling out mixed strategies to ensure profitability, manufacturing firms are persistently challenged with declining profits. It is from this note that the current paper investigates a combined model consisting of outsourcing and lean practices on how it influences profitability based on the following hypothesis.

- *H. Outsourcing mediates the relationship between lean manufacturing practices and the profitability of manufacturing firms.*

Methodology

The study used a cross-sectional research design because its statistical tools are good at providing accurate estimates that are reliable and objective (Saunders and Lewis, 2014). The study involved a sample of 82 manufacturing firms based on Krejcie and Morgan (1970) and focused on procurement, production, finance and administration departments that researchers believed had necessary information. According to Uganda Manufacturers Association's membership report 2011/2012, there are 150 both large and small medium enterprises (SMEs) manufacturing firms across Uganda of which, there are 83 and 17 firms in Kampala and Jinja respectively totaling 100 firms from which the sample was drawn. Stratified random sampling was employed by grouping the manufacturing firms into strata (Large and SMEs). Purposive sampling was employed in the operational stratum of firms by selecting two respondents from each firm in terms of supervisory and

administrative roles. A sampling frame was generated by arranging manufacturing firms and assigning serial numbers from 001 to 100. Subsequently, a random number generator in Excel was utilized to select the sample.

Previously used measurement indicators were adopted and modified to match with current study upon which the questionnaire was developed. The questionnaire was given to two manufacturing experts in procurement to solicit their views on questions raised in the instrument. Their views were tested for reliability and content validity and the results are presented in Table 1. Preliminary analysis to determine sample characteristics, reliability and validity was performed in SPSS while the mediation effect was tested using the Med-Graph Excel programme based on Sobel tests following a partial mediation approach (Jose, 2013, Baron and Kenny, 1986, Sobel, 1987). Preliminary analysis aimed at data completeness, accuracy, normality, reliability and validity. While the mediation test aimed at determining the significance level of the mediation effect. The results of mediation are presented in Table 2 with corresponding Figure 1.

Table 1. Reliability and Validity

Variable	Number of indicators	Cronbach Alpha	Content validity index
Outsourcing	16	0.835	0.813
Lean Manufacturing	16	0.706	0.750
Profitability	14	0.830	0.714

Table 2. Sobel Test Results

Type of mediation: Significant			
Sobel z-value = 2.562366, p = 0.010396			
95% Symmetrical Confidence interval			
	Lower	0.03906	
	Higher	0.29326	
Unstandardized indirect effect			
	a*b	0.16616	
	se	0.06485	
Effective Size measures			
<u>Standardised Coefficients</u>			<u>R² Measures (Variance)</u>
Total:		0.649	0.420
Direct:		0.519	0.211
Indirect:		0.129	0.209
Indirect to Total ratio		0.199	0.497

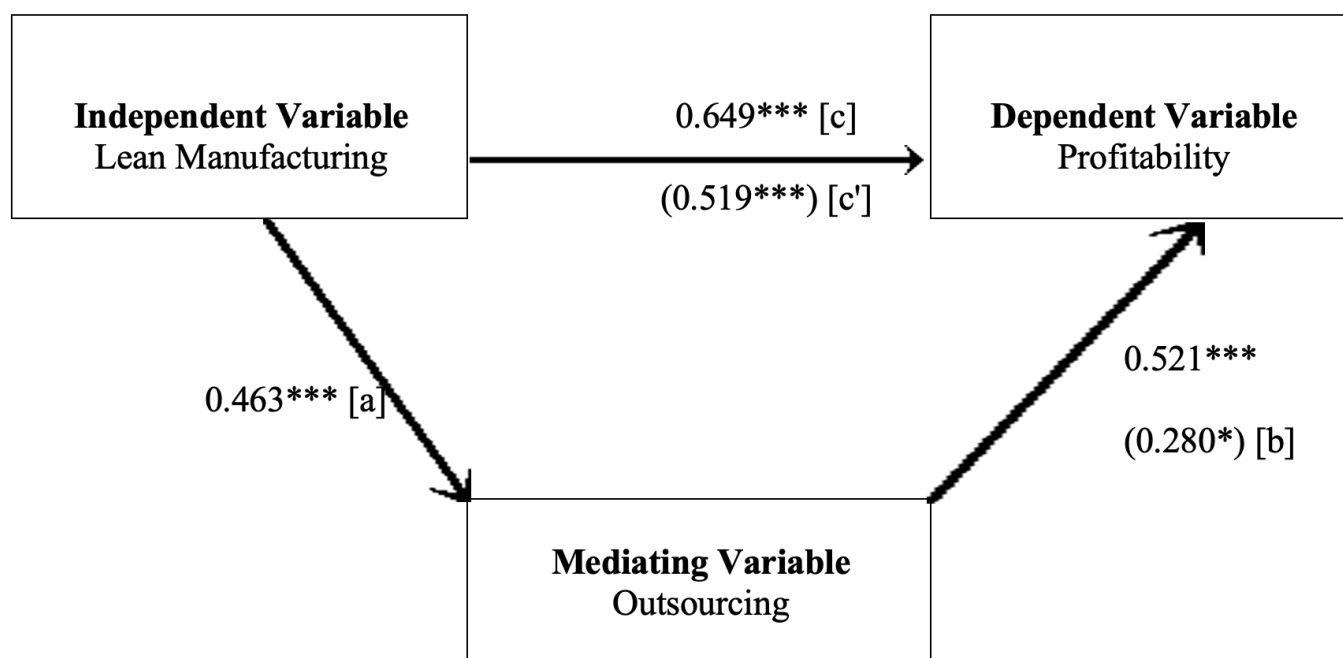


Figure 1. Outsourcing mediates Lean manufacturing and Profitability

Results and Discussion

This paper investigated whether outsourcing mediates the relationship between lean manufacturing practices and the profitability of manufacturing firms. Data collected shows that out of 164 questionnaires distributed, 161 valid responses were obtained representing a 98.2% response rate. This high response rate is attributed to numerous reminders and physical visits by the researchers. Based on the results of the reliability analysis displayed in Table 1, it was established that the questions used to obtain information from respondents were reliable since Cronbach's Alpha coefficients for all variables are above 0.7 (Mugenda and Mugenda, 2003). This concludes that the question items included in the questionnaire were reliable enough to be considered in this research study. In addition, the content validity index shows that all the questionnaire items were relevant since the CVI for all variables is above 0.7 as depicted in Table 1. To successfully address the research objectives, the researchers carried out correlation and regression analyses. These analyses were necessary as a requirement for testing mediation effects following a five-step process (Mathieu and Taylor, 2006, MacKinnon et al., 2002, James et al., 2006, Baron and Kenny, 1986). Based on these analyses, correlation results proved that all three variables are significantly related to each other (Profitability regressed on Lean: $\beta = 0.463$, $p = 0.000$; Outsourcing regressed on Lean: $\beta = 0.521$, $p = 0.000$ and Profitability regressed on Lean: $\beta = 0.649$, $p = 0.000$).

Having satisfied mediation tests steps 1-3 under correlations, a hierarchical regression analysis was carried out with the aim of determining how lean manufacturing practices (Independent) and outsourcing (Mediator) are related to profitability (Dependent). This is a fourth mediation test requirement that must be met before the Sobel test (James et al., 2006, MacKinnon et al., 2002, Baron and Kenny, 1986). The results based on beta coefficients revealed that both independent and mediating variables are significantly related to profitability (Outsourcing: $\beta = 0.280$, $p < 0.01$ and Lean: $\beta = 0.519$, $p < 0.001$). Finally, the Sobel test was carried out to determine the type of mediation and significance level. The results

revealed that outsourcing significantly mediated the relationship between lean manufacturing practices and the profitability of manufacturing firms (Sobel Z-value = 2.562366, $p = 0.010396$). This is a partial mediation because lean manufacturing practices directly predicted profitability ($\beta = 0.519$) and indirectly through outsourcing ($\beta = 0.129$) totaling a standardized coefficient of 0.649. This implies that the hypothesis is significantly supported and managers of manufacturing firms should consider applying both lean practices and outsourcing strategies simultaneously in order to ensure profitability. Manufacturing firms should shift away from previous management mechanisms of employing these strategies singly and adopt a mixed model consisting of these two strategies since they have displayed a viable interactive effect capable of ensuring firms' profitability.

Conclusion

Hybrid and mixed models are increasingly attracting management attention in meeting firms' objectives. This study complements this by introducing an empirically tested model to address profitability issues facing the manufacturing industry. Managers and scholars are encouraged to adopt this model since the results demonstrate that outsourcing significantly mediated the relationship between lean manufacturing practices and the profitability of manufacturing firms. In doing so, the profitability of manufacturing firms would be increased. In addition, more mediation models are encouraged by scholars using different strategies as well as current ones in different fields globally so that stakeholders can concretize their application.

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