

The Impact of Fintech Adoption on Corporate Performance: Evidence from Manufacturing Firms in Tanzania

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Abstract

Financial technology (fintech) adoption has become increasingly important in the context of rapid technological advancement due to its potential to transform business operations and enhance corporate performance. Against this background, this study examines the impact of fintech adoption on corporate performance in the Tanzanian manufacturing sector using a cross-sectional analytical framework. The study is anchored in the Resource-Based View Theory, which conceptualizes fintech as a strategic organizational resource capable of generating competitive advantage when effectively deployed. Empirically, the study employs an Endogenous Switching Regression Model to address self-selection bias and to compare profitability outcomes between fintech-adopting and non-adopting firms. The findings reveal that firms adopting fintech experience significantly higher profit levels than non-adopters, with capital investment in fintech and accumulated experience in its use emerging as the most critical drivers of performance gains. In contrast, firms that do not adopt fintech exhibit weaker and less consistent profitability outcomes. These results suggest that fintech adoption enhances corporate performance primarily through sustained investment and learning effects rather than through adoption alone. Based on the findings, the study recommends that manufacturing firms prioritize fintech adoption as a strategic investment and that policymakers should support this process by improving access to fintech infrastructure and reducing fiscal barriers, such as taxes on imported fintech-related technologies, to accelerate digital transformation in Tanzania's manufacturing sector.

Keywords: Fintech, Corporate performance, Tanzania, manufacturing firms.

Introduction

The Tanzanian manufacturing sector remains one of the most important contributors to the national economy. It plays a central role in job creation, economic transformation, domestic value addition through processing of raw

materials, export promotion, foreign exchange earnings, and reduction of trade balance deficits (Kitole & Utouh, 2023; Utouh et al., 2024; Mwinuka & Mwangoka, 2023). In 2018, the sector generated approximately USD 4.1 billion, equivalent to about 8% of GDP, representing a significant 39% increase compared to 2014 levels (Mwinuka & Mwangoka, 2023). These trends highlight the sector's strategic importance in supporting Tanzania's long-term goal of becoming a semi-industrialized economy by 2025.

In recent years, financial technology (fintech) has emerged as a powerful force transforming business operations across multiple sectors, including the manufacturing sector. In Tanzania, fintech has recorded a notable growth driven by regulatory improvements, including the introduction of innovation-friendly frameworks such as the regulatory sandbox supervised by the Bank of Tanzania [BOT], 2023; Macha & Massawe, 2023). Manufacturing firms are increasingly adopting fintech solutions including digital payment systems, cloud-based financial management platforms, supply chain financing tools, and payroll automation systems to manage transactions more efficiently, improve access to financing, reduce operational costs, enhance cash flow visibility, and support faster decision-making (Mwemezi et al., 2022; Bhutto et al., 2023; Dwivedi et al., 2021).

Despite these positive developments, the level of fintech adoption among manufacturing firms in Tanzania remains relatively low compared to other sectors such as banking, retail, and agriculture (Mwinuka & Mwangoka, 2023). Several persistent barriers continue to slow down adoption. These barriers include limited awareness of available fintech solutions, insufficient technical knowledge among staff, high initial capital requirements, concerns about digital infrastructure reliability, and perceived risks related to cybersecurity and regulatory compliance (Dwivedi et al., 2021). These challenges have contributed to slower digital transformation in the manufacturing sector relative to other parts of the economy.

A growing body of empirical research has demonstrated that fintech adoption is generally associated with improved firm performance. Studies across different contexts have shown positive effects on profitability, operational efficiency, cost reduction, access to credit, service innovation, and overall competitiveness, particularly when firms invest sufficient resources and build internal capacity to use these technologies effectively (Bhutto et al., 2023; Dwivedi et al., 2021; Mwemezi et al., 2022; Ullah, 2020; Chen & Tsou, 2007; Ferrer-Dávalos, 2023). However, most of the existing evidence comes from the financial services sector, SMEs in other industries, or firms located outside Africa. Very few studies have specifically examined the relationship between fintech adoption and corporate performance within the manufacturing sector in developing African economies such as Tanzania.

While fintech is increasingly recognized as an important enabler of financial inclusion and business growth across Africa (Flötotto et al., 2022), its concrete impact on corporate performance in the Tanzanian manufacturing sector remains largely underexplored. Most research on the Tanzanian manufacturing sector has focused on macroeconomic drivers of sector growth (Mwinuka & Mwangoka, 2023; Kitole & Utouh, 2023) and has not isolated the firm-level effects of fintech adoption. This creates a significant knowledge gap regarding whether and how fintech contributes to tangible improvements in profitability, cost efficiency, and competitiveness among manufacturing enterprises in Tanzania and what factors determine the size of these benefits. Recent studies have begun to address fintech and manufacturing performance in Tanzania specifically: Minde and Mrindoko (2024) examine the effect of fintech on the financial performance of manufacturing SMEs in Dar es Salaam using descriptive statistics and multiple regression, while Rutainurwa et al. (2024) analyse how ICT-enabled supply chain integration capabilities mediate the relationship between ICT capability and financial performance among manufacturing SMEs in Mbeya. However, these studies rely on conventional regression techniques that treat fintech adoption as exogenous and do not correct for the self-selection bias that arises when better-resourced or more capable firms are simultaneously more likely to adopt fintech and to perform better regardless of adoption; they are also confined to SMEs rather than the full spectrum of small, medium, and large manufacturing firms. The precise gap that this study addresses is therefore not the complete absence of Tanzanian evidence, but the absence of causal, selection-corrected evidence on the fintech-performance relationship across the Tanzanian manufacturing sector as a whole. Against this background, the present study aims to examine the impact of fintech adoption on corporate performance in the Tanzanian manufacturing sector. Specifically, the research seeks to evaluate the effect of fintech adoption on corporate financial performance, particularly profitability by comparing firms that have adopted fintech with those that have not, and to assess how certain firm-level characteristics (such as the amount of capital invested in fintech, years of experience using fintech, level of awareness about fintech tools, and the specific types of fintech tools adopted) explain differences in performance outcomes between adopting and non-adopting firms. By addressing these issues through a cross-sectional design and an econometric approach that accounts for selection bias, the study intends to generate evidence that can inform firm-level strategies and support government and sector policies aimed at accelerating digital transformation in the Tanzania's manufacturing sector.

Literature Review

Theoretical Underpinning

The Resource-Based View (RBV) Theory, originally articulated by Wernerfelt (1984) and further developed by Barney (1991), argues that differences in firm performance are primarily driven by heterogeneity in internal resources and capabilities rather than by external market structure alone. Departing from market-based perspectives such as Porter's Five Forces, the RBV posits that sustainable competitive advantage arises when firms control resources that are Valuable, Rare, Inimitable, and Non-substitutable (VRIN). Such resources enable firms to improve efficiency, innovate, and respond effectively to competitive pressures, thereby generating persistent performance advantages that are difficult for competitors to replicate. Within this framework, fintech adoption can be conceptualized as a strategic, firm-specific capability whose performance effects depend on the availability and effective coordination of complementary internal resources. In the context of Tanzanian manufacturing firms, fintech adoption requires not only access to digital financial tools but also adequate financial capital, skilled personnel, organizational learning, and managerial capacity to integrate these technologies into core business processes. The RBV therefore explains why fintech adoption does not yield uniform outcomes across firms: enterprises with stronger resource endowments and greater absorptive capacity are more likely to translate fintech use into higher profitability, cost efficiency, and operational effectiveness. Guided by this theoretical lens, the present study treats fintech adoption as an endogenous strategic choice shaped by firm-level resources and, it employs an econometric approach that explicitly accounts for such heterogeneity when assessing its impact on corporate performance.

Empirical Literature Review

Empirical literature on technology and fintech adoption consistently demonstrates that digital technologies play a significant role in enhancing firm performance, although the magnitude and mechanisms of impact vary across sectors, institutional contexts, and organizational capabilities. Early evidence highlights the importance of governance and organizational structures in determining the effectiveness of technology adoption. Muawanah (2018), examining Indonesian listed banks, found that Information Technology (IT) adoption measured through IT investment and IT management capability positively influences firm performance as proxied by return on assets when supported by strong Corporate Governance (CG) mechanisms. Using multiple linear regression on data extracted from annual reports between 2011 and 2013, the study concluded that effective CG enhances IT monitoring and strategic alignment, thereby strengthening the performance benefits of IT adoption.

Similarly, Chen and Tsou (2007) emphasize the indirect performance effects of Information Technology (IT) adoption by highlighting its role in strengthening firms' innovation capabilities. Drawing on survey data from 124 financial institutions in Taiwan and employing Partial Least Squares (PLS) analysis, the study demonstrates that IT adoption significantly enhances service innovation, which subsequently translates into sustained competitive advantage. Rather than exerting a direct influence on performance outcomes, IT adoption operates as a strategic enabler that supports the development of innovative service offerings, improved customer responsiveness, and differentiation in highly competitive financial markets. These findings suggest that the performance benefits of IT investments are largely contingent upon firms' ability to leverage digital technologies to innovate, reposition their services, and create superior value, thereby extending beyond short-term efficiency gains to long-term strategic competitiveness.

Evidence from developing economies further supports the positive performance implications of technology adoption while highlighting contextual challenges. Ullah (2020), in his study, investigated the adoption of Customer Relationship Management (CRM) technology in Pakistani banks and reported a significant positive effect on organizational performance, particularly in strengthening business-to-customer relationships and customer satisfaction. However, the study also demonstrates that technological turbulence weakens this relationship, suggesting that unstable technological environments can constrain the performance benefits of digital technologies. In contrast, Sawng et al. (2018), analysing Korean export firms, found that smart technology adoption has a limited impact on the overall firm performance. Their multi-stage methodology combining surveys, structural equation modelling, and performance indices reveals that financial performance remains the weakest dimension, largely due to implementation inefficiencies and insufficient financial integration.

Beyond banking and manufacturing-adjacent sectors, research on information systems adoption reinforces the importance of organizational readiness. Arjang et al. (2024) examined the determinants of Accounting Information System (AIS) performance in retail enterprises using computerized systems. Employing survey data analysed through multiple linear regression, the study found that technological advancement, user training programs, and top management support significantly enhance AIS performance. These findings align with prior studies emphasizing that technological investments yield performance gains only when complemented by human capital development and managerial commitment.

Recent studies extend the technology–performance discourse by incorporating governance diversity and fintech adoption. Nugroho and Anita (2023) analysed banks recognised in Indonesia's Digital Banking Awards between 2017 and 2022 to assess the interaction between gender diversity and

fintech adoption. Using panel regression and logit models, they found that women's representation on boards positively influences financial performance, though not environmental performance. They further found that Fintech adoption strengthens the relationship between women's board representation and environmental performance but does not significantly affect financial outcomes. This suggests that fintech acts as a contextual enhancer rather than a direct driver of performance.

Other empirical contributions adopt integrated theoretical frameworks to assess advanced technology adoption. Hasani et al. (2023), combining the diffusion of innovation theory, technology acceptance model, and technology–organization–environment framework with the balanced scorecard approach, found that cybersecurity adoption positively influences organizational performance among UK SMEs. Using structural equation modelling on survey data from IT professionals, the study confirmed that technological adoption enhances performance when aligned with organizational strategy and environmental conditions.

Further evidence from the banking sector highlights the role of financial literacy and digital transformation. Hidayat-ur-Rehman (2024) examined the relationship among digital transformation, fintech adoption, competitiveness, and sustainable firm performance in Pakistani banks. Analysing survey data using PLS-SEM and the Hayes Process Model, the study found that digital transformation significantly improves sustainable performance, with fintech adoption and competitiveness acting as mediating variables. Financial literacy emerges as a critical moderator, amplifying the effects of digital transformation on fintech adoption and competitiveness, although its direct impact on sustainable performance is limited. Micro-level evidence also confirms the operational benefits of computerized systems. Ferrer-Dávalos (2023), through an action research case study of 32 microenterprise managers, evaluated the administrative efficiency before and after the implementation of a customized computerized management system. Using a student's t-test, the study reported statistically significant improvements in efficiency, accuracy, and processing speed, demonstrating that digital systems enhance performance even in small-scale enterprises when tailored to organizational needs.

Recent fintech-specific studies further strengthen the empirical linkage between fintech adoption and firm performance. Cai (2025), using firm-level data from China and a fintech development index constructed through text-mining techniques, found that fintech adoption significantly enhances corporate profitability by reducing information asymmetry, improving resource allocation, and mitigating financial risks. The study also shows that these effects are stronger in non-state-owned firms, highlighting the role of ownership structure and governance flexibility in leveraging fintech innovations. Complementing this evidence, Naser et al. (2024), in their study,

found that fintech innovation positively affects the performance of banks listed on the Bahrain Bourse, particularly through improved operational efficiency, earnings capacity, and capital adequacy. However, the strength of this relationship varies with firm age and ownership type, reinforcing the argument that fintech benefits are context-dependent.

At the macroeconomic level, Ngong et al. (2024) provide supporting evidence from Sub-Saharan Africa by demonstrating a long-run relationship between fintech development and economic growth in East African Community countries. Using panel autoregressive distributed lag models, Ngong et al.'s study found both bidirectional and unidirectional causal relationships between fintech indicators and growth. Although macro-focused, this evidence suggests that fintech adoption contributes to productivity and efficiency improvements that indirectly support firm-level performance.

Overall, the empirical literature suggests that technology and fintech adoption generally enhance firm performance, but their effectiveness is conditional on governance quality, organizational capabilities, innovation capacity, environmental stability, and institutional context. Despite the growing body of global evidence, a clear empirical gap remains in relation to manufacturing firms in Tanzania and Sub-Saharan Africa more broadly. Existing studies predominantly focus on banks, listed firms, SMEs, or macroeconomic outcomes, with limited firm-level evidence from the manufacturing sector. Moreover, many studies rely on conventional regression techniques that do not adequately address selection bias between adopters and non-adopters of fintech. This study seeks to fill these gaps by empirically examining the impact of fintech adoption on corporate performance in Tanzania's manufacturing sector using an econometric approach that explicitly accounts for firm heterogeneity and selection effects.

Research Methodology

This study adopted a quantitative research approach to examine the relationship between fintech adoption and corporate performance in the Tanzanian manufacturing sector. Quantitative approach allows for systematic numerical analysis of both the determinants and performance outcomes of fintech adoption among firms (Bidzakin et al., 2019). In terms of scope of the study, it focused on small, medium, and large manufacturing enterprises operating within Tanzania, with a geographical emphasis on Dar es Salaam, Arusha, Mwanza, and Dodoma, selected to capture diverse industrial structures and economic conditions across the country. These urban centers represent key manufacturing and commercial hubs, providing a comprehensive view of fintech adoption patterns within the sector. Accordingly, the study area was limited to these cities, enabling a localized yet representative assessment of firm-level fintech adoption and performance

outcomes. The target population comprised manufacturing enterprises of varying operational scales within the selected regions, allowing the study to account for heterogeneity in firm size, resources, and technological capacity. The sampling frame therefore consisted of all registered small, medium, and large manufacturing firms operating in Dar es Salaam, Arusha, Mwanza, and Dodoma, forming the basis for sample selection and empirical analysis.

This study employed a sample size of 385 manufacturing firms, determined based on statistical power considerations and the need to ensure adequate representation of enterprises across different size categories within the Tanzanian manufacturing sector. Given the absence of a known population frame, the sample size was calculated at a 95 percent confidence level with a 5 percent margin of error. To achieve proportional representation of small, medium, and large enterprises within each study city, a stratified random sampling technique was employed. Stratification was guided by available information on the distribution of manufacturing enterprises across size categories in Dar es Salaam, Arusha, Mwanza, and Dodoma, thereby ensuring diversity within the sample while enabling meaningful comparisons across firm sizes and regions. This sampling strategy enhances the external validity and generalizability of the findings by ensuring that the sample reflects the broader structure of Tanzania's manufacturing sector. Data was collected using structured questionnaires selected for their ability to generate standardized and quantifiable responses efficiently across a large sample. Both physical and digital modes of questionnaire administration were utilized to accommodate varying respondent preferences, improve accessibility, and enhance data completeness and response rates, in line with the methodological guidance of Cooper and Schindler (2020) which is expressed as follows:

$$n = \frac{z^2 p(1 - p)}{e^2}$$

Whereby, n=required sample size; Z=Z-score (based on the desired confidence level)

95% confidence level (Z=1.96); Expected proportion (p=0.5); Margin of error (e=0.05)

$$n = \frac{(1.96)^2 \times (0.5)}{(0.05)^2} = 385$$

Empirical Modelling

The Endogenous Switching Regression (ESR) model was utilized to mitigate self-selection bias in evaluating the impact of fintech adoption on corporate performance. This approach also identified the determinants influencing fintech adoption and assessed its effects on performance outcomes. Originally

developed by Lee (1982) as an extension of Heckman's selection correction method (Fitawek & Hendriks, 2021), the ESR model has become a prominent tool for addressing self-selection bias in empirical studies (Fitawek & Hendriks, 2021). While Propensity Score Matching (PSM) is another technique used to tackle self-selection bias, it falls short in accounting for biases resulting from unobserved factors (Bidzakin et al., 2019). In contrast, the ESR model overcomes this limitation by incorporating instrumental variables and counterfactual analysis, effectively addressing both observable and unobservable factors in the estimation process (Tesfay, 2020).

The estimation of the ESR model follows a two-stage process: the first stage employs probit regression to estimate the likelihood of fintech adoption, while the second stage estimates the outcome determinants separately for fintech adopters and non-adopters (Bidzakin et al., 2019). However, this two-stage method introduces heteroskedastic residuals, making it difficult to derive consistent standard errors without complex adjustments (Tesfay, 2020). To address this issue, the full information maximum likelihood estimator was utilized, enabling simultaneous estimation of the selection and two outcome equations (Bidzakin et al., 2019). The conceptual framework is grounded in the premise that corporates decide whether to adopt fintech based on their aim to enhance corporate performance. This is done under the assumption that corporates are risk-neutral, and they take into account the expected profit (D_e^*) derived from adopting fintech and the expected profit (D_n^*) derived from not adopting fintech. The difference in the expected profit between fintech and non-fintech adopters is defined as D_i^* , that is, $D_i^* = D_e^* - D_n^*$, then if $D_i^* > 0$, then the corporates would choose to adopt fintech. However, D_i^* cannot be observed, it can be expressed as a function of observable elements in the latent variable model as shown below:

$$D_i^* = Z_i\theta + \mu_i \text{ with } D_i = \begin{cases} 1 & \text{if } D_i^* > 0 \\ 0 & \text{if otherwise} \end{cases}$$

Here, D_i is a binary variable, taking a value of 1 if the firm adopts fintech and 0 otherwise. Z_i represents a vector of factors influencing the decision to adopt fintech, such as firm and worker characteristics. α is a vector of unknown parameters to be estimated, and u_i denotes the error term, which is assumed to be normally distributed with a mean of zero. Accordingly, two separate outcome equations are specified for fintech adopters and non-fintech adopters:

Regime 1 (fintech adopters)

$$Y_{ei} = X_i\beta_{ei} + \varepsilon_{ei} \text{ if } D_i = 1 \dots\dots\dots 2a$$

Regime 2 (non-fintech adopters)

$$Y_{ni} = X_i\beta_{ni} + \mu_{ni} \text{ if } D_i = 0 \dots\dots\dots 2b$$

In this context: Y_{ei} and Y_{ni} represent the outcomes, specifically the profits generated by fintech adopters and non-adopters, respectively. X_i is a vector of exogenous variables that may influence the outcomes. ε_{ei} and μ_{ni} are random disturbance terms associated with the outcome variables. The variables Z_i in the selection equation (1) and X_i in the outcome equations (2a) and (2b) are permitted to overlap. In this setup, the selection equation (1) is estimated using all explanatory variables specified in the outcome equations (2a) and (2b), along with one instrumental variable. A valid instrumental variable must affect the decision to adopt fintech but not directly influence the outcomes. The three error terms μ_i , ε_{ei} and ε_{ni} from equations (1), (2a), and (2b) are assumed to follow a tri-variate normal distribution with zero mean and a covariance matrix.

$$\Sigma = \begin{bmatrix} \sigma_{\eta}^2 & \sigma_{\varepsilon\eta} & \sigma_{n\eta} \\ \sigma_{\varepsilon\eta} & \sigma_{\varepsilon}^2 & . \\ \sigma_{n\eta} & . & \sigma_n^2 \end{bmatrix}$$

where σ_{η}^2 is a variance of the error term in the selection equation (1), and σ_n^2 as well as σ_{ε}^2 are the variances of the error terms in the outcome equations (2a) and (2b); $\sigma_{\varepsilon\eta}$ is a covariance of μ_i and ε_{ei} , and $\sigma_{n\eta}$ is a covariance of μ_i and ε_{ni} . Note that Y_{ei} and Y_{ni} are not observed simultaneously, which implies that the covariance between ε_{ei} and ε_{ni} is not defined and is therefore indicated as dots in the covariance matrix (Cao et al., 2021). Considering that the error term of the selection equation (1) is correlated with the error terms of the outcome equations (2a) and (2b), the expected values of the error terms ε_{ei} and ε_{ni} conditional on the sample selection is non-zero and are defined as:

$$E[\mu_{ei}|D_i = 1.] = \sigma_{\varepsilon\eta} \frac{\phi(Z_i\alpha)}{\Phi(Z_i\alpha)} = \sigma_{\varepsilon\eta}\lambda_{ei} \dots\dots\dots (3a)$$

$$E[\mu_{ni}|D_i = 0.] = \sigma_{n\eta} \frac{\phi(Z_i\alpha)}{1 - \Phi(Z_i\alpha)} = \sigma_{n\eta}\lambda_{ni} \dots\dots\dots (3b)$$

where $\phi(\cdot)$ and $\Phi(\cdot)$ are the standard normal probability density function and normal cumulative density function, respectively, $\lambda_{ei} = \frac{\phi(Z_i\alpha)}{\Phi(Z_i\alpha)}$ and $\lambda_{ni} = \frac{\phi(Z_i\alpha)}{1 - \Phi(Z_i\alpha)}$. If the estimated covariance $\hat{\sigma}_{\varepsilon\eta}$ and $\hat{\sigma}_{n\eta}$ are statistically significant, then the adoption of fintech and the outcomes are related. It means that there is an indication of endogenous switching and the null hypothesis showing lack of sample selectivity bias being rejected. Explicitly, the ESR model reports the selectivity bias issue ensuing from overlooked factors as a misplaced variable

problem (Tesfay, 2020). After the selection equation is estimated, the inverse Mills ratios (λ_{ei} and λ_{ni}) and the covariance terms ($\hat{\sigma}_{e\eta}$ and $\hat{\sigma}_{\eta\eta}$) are designed and engaged back to equations (2a) and (2b). In this respect, the inverse Mills ratios (λ_{ei} and λ_{ni}) address for selectivity bias resulting from unobservable factors.

Subsequent to Bidzakin et al. (2019), the coefficients from the ESR model were employed to calculate the average treatment effect on the treated (ATT). The detected and unnoticed counterfactual consequences for fintech are presented as shown in equations 4a and 4b profits generated through fintech adoption:

$$E[Y_{ei}|D_i = 1.] = X_i\beta_{ei} + \sigma_{e\eta}\lambda_{ei} \dots\dots\dots (4a)$$

Profits generated through non-fintech adoption (counterfactual):

$$E[Y_{ni}|D_i = 1.] = X_i\beta_{ni} + \sigma_{n\eta}\lambda_{ei} \dots\dots\dots (4b)$$

Equation (4a) represents the expected outcome for a firm adopting fintech, while equation (4b) reflects the counterfactual expected outcome for a firm not adopting fintech. Based on the framework of Heckman (2014), these expected outcomes are utilized to calculate unbiased treatment effects, specifically the Average Treatment Effect on the Treated (ATT). The ATT quantifies the difference between the actual outcomes of fintech adopters and their hypothetical outcomes had they not adopted fintech, providing a robust measure of the impact of fintech adoption. Although the ESR model can be estimated using a two-step procedure, this approach generates heteroskedastic residuals and inconsistent standard errors (Tesfay, 2020). To overcome this limitation, the study employs Full Information Maximum Likelihood (FIML) estimation. FIML simultaneously estimates the selection equation and both outcome equations, yielding consistent and efficient parameter estimates while accounting for the correlation structure of the error terms.

Under FIML, the log-likelihood function is specified as a joint likelihood comprising two components: one for firms that adopt fintech and another for firms that do not. For adopters, the likelihood combines the probability of adoption with the conditional density of profits under Regime 1. For non-adopters, it combines the probability of non-adoption with the conditional density of profits under Regime 2. Maximizing this joint likelihood yields parameter estimates for all equations in a single step, ensuring internal consistency across regimes. Following estimation, the model enables computation of counterfactual outcomes and treatment effects. In particular, the Average Treatment Effect on the Treated (ATT) is derived as the difference between observed profits of fintech adopters and their counterfactual profits had they not adopted fintech:

$$ATT = E[Y_{ei}|D_i = 1.] - E[Y_{ni}|D_i = 1.] = X_i(\beta_{ei} - \beta_{ni}) + \lambda_{ei}(\sigma_{e\eta} - \sigma_{n\eta}) \dots \dots \dots (5)$$

This measure provides an unbiased estimate of the causal impact of fintech adoption on corporate performance, and net of selection bias arising from both observable and unobservable factors.

Results

Table 1 presents the descriptive statistics of the key variables used to examine the impact of fintech adoption on corporate performance in the Tanzanian manufacturing sector. The results show that sampled firms have an average of 4 years of experience in the manufacturing sector, with considerable variation, indicating heterogeneity in operational maturity. Firm size also varies substantially, with an average of 43 employees, ranging from small enterprises with 4 workers to larger firms employing up to 60 workers, confirming adequate representation across manufacturing scales. The average capital invested in fintech is TZS 6,760,000, suggesting that fintech adoption entails a significant financial commitment, while the mean duration of fintech use is 2 years, indicating that fintech adoption remains relatively recent among manufacturing firms. Despite these results, firms report notable financial benefits, with an average monthly cost reduction of TZS 590,000 following fintech adoption, reflecting improvements in operational efficiency and cost management. Furthermore, average profits generated after fintech adoption amount to TZS 3,500,000, with wide dispersion across firms, suggesting that although fintech adoption is generally associated with improved profitability, the magnitude of gains differs depending on firm-specific characteristics.

Table 1: Firm Characteristics

Variable	Variable definition	Mean	Standard Deviation	Minimum Value	Maximum Value
Y	Years of experience in manufacturing sector	4	3	1	9
N	Number of employees in a firm	43	21	4	60
CA	Capital invested in fintech (Tshs)	6,760,000	2,000,000	3,000,000	7,000,000
FUY	Years on which the organization have been using fintech	2	3	1	5
CO	Cost reduced after adopting fintech per month (Tshs)	590,000	350,000	450,000	2,000,000
P	Profits generated after using fintech (Tshs)	3,500,000	1,220,000	2,000,000	6,000,000

Source: Authors' computation from field survey data (2024).

Table 2 presents the distribution of key categorical variables related to firm characteristics and fintech adoption in the Tanzanian manufacturing sector. The gender composition of respondents indicates a relatively balanced representation, with males accounting for 54 percent and females 46 percent of HR personnel, suggesting inclusivity in human resource roles within manufacturing firms. The majority of respondents are HR Officers (78.2 percent), while HR Managers constitute 21.8 percent, reflecting the operational structure of HR functions in most firms. With respect to fintech awareness, a substantial proportion of respondents (75.32 percent) report being aware of fintech, indicating a generally high level of exposure to digital financial technologies within the sector. However, nearly one-quarter of respondents remain unaware, pointing to persistent information and knowledge gaps.

Table 2: Categorical Firm and Fintech Adoption Variables

Variable	Category	Frequency (%)
Sex of HR respondent	Male	208 (54.0)
	Female	177 (46.0)
Designation	HR Manager	84 (21.8)
	HR Officer	301 (78.2)
Awareness of fintech	Yes	290 (75.32)
	No	95 (24.68)
Fintech tools adopted	Digital payment systems	162 (42.01)
	Payroll automation systems	162 (42.01)
	Supply chain financing platforms	34 (8.83)
	Cloud-based financial management tools	27 (7.01)

Source: Authors' computation from field survey data (2024).

In terms of fintech tools adopted, digital payment systems and payroll automation systems emerge as the most widely used, each adopted by 42.0% of firms, highlighting a preference for fintech solutions that directly support transactional efficiency and routine financial operations. Adoption of more advanced fintech applications, such as supply chain financing platforms and cloud-based financial management tools, remains relatively limited, suggesting that fintech usage in the manufacturing sector is still concentrated in basic operational functions rather than integrated financial management and strategic financing solutions. Table 3 presents the estimation results from the Endogenous Switching Regression (ESR) model, distinguishing between the fintech adoption decision (selection equation) and profit outcomes for fintech adopters and non-adopters, where corporate performance is measured as the natural logarithm of profits. The ESR framework allows for heterogeneous profit structures across regimes while correcting for selection bias arising from both observable and unobservable firm characteristics. The results reveal clear

differences in how firm-level factors influence profitability depending on whether firms adopt fintech or not.

Among fintech adopters, years of firm experience (Y) exhibit a negative and marginally significant effect on profits ($\beta = -0.050$, $p \approx 0.064$), significant at the 10 percent level, suggesting that older firms may face structural rigidities or legacy systems that limit the profitability gains from fintech adoption. In contrast, experience among non-adopters shows a positive but statistically insignificant association with profits ($\beta = 0.059$, $p > 0.10$), indicating that experience alone does not substantially drive profitability without fintech integration. Firm size, measured by the number of employees, does not have a statistically significant effect on profits for either adopters ($p > 0.70$) or non-adopters ($p > 0.80$), implying that scale effects are not a dominant factor once selection and other controls are accounted for.

Capital invested in fintech (CA) emerges as one of the most influential determinants of profitability among fintech adopters, with a positive and statistically significant coefficient ($\beta = 0.465$, $p < 0.05$). This indicates that firms committing greater financial resources to fintech infrastructure, systems, and integration experience higher profit gains. Similarly, years of fintech usage (FUY) have a positive and statistically significant effect on profits for adopters ($\beta = 0.488$, $p < 0.05$), highlighting the importance of learning-by-doing and accumulated operational experience in realizing fintech-related performance benefits. Among non-adopters, both capital investment and years of fintech use, show positive but statistically insignificant effects ($p > 0.10$), underscoring that profitability gains materialize primarily through actual fintech adoption rather than potential or partial exposure.

In contrast, monthly cost reductions (CO) do not show statistically significant effects on profits for either adopters ($p > 0.90$) or non-adopters ($p > 0.30$), suggesting that cost savings alone do not explain profit differentials once other factors are controlled for. Human resource characteristics display mixed results: designation has a negative and statistically significant effect among adopters ($\beta = -1.645$, $p < 0.05$), while awareness of fintech and the number of fintech tools adopted show positive but statistically insignificant relationships with profits ($p > 0.10$). Overall, the findings indicate that fintech adoption enhances corporate performance primarily through capital intensity and sustained usage, rather than firm size, awareness, or isolated cost savings, reinforcing the view that fintech adoption constitutes a strategic, resource-based investment that reshapes firms' profit-generation processes.

Discussion

The findings of this study demonstrate that fintech adoption significantly enhances corporate profitability in the Tanzanian manufacturing sector, primarily through capital intensity in fintech investment and accumulated experience in using fintech solutions. Firms that commit greater financial

resources to fintech infrastructure and sustain its use over time realize superior profit outcomes, while non-adopters exhibit weaker and largely insignificant profitability drivers. This pattern suggests that fintech adoption is not merely an operational add-on but a strategic, resource-dependent process that reshapes firms' profit-generation mechanisms. The results are consistent with the Resource-Based View, which posits that competitive advantage arises when firms deploy valuable resources in ways that are difficult to replicate and they are effectively integrated into organizational processes.

Table 3: Determinants of Fintech Adoption and Its Impact on Corporate Performance (Log of Profits)

Variable	Selection equation			Outcome equation					
	Coef.	Std. Err.	p-value	Fintech adopters			Non-fintech adopters		
Years of experience (Y)	0.023	0.015	0.128	-	0.027	0.064*	0.059	0.015	0.000***
Number of employees (N)	0.150	0.358	0.676	-	0.780	0.797	0.070	0.358	0.845
Capital invested in fintech (CA)	0.045	0.004	0.000***	0.465	0.230	0.043**	0.289	0.096	0.003***
Years using fintech (FUY)	-	0.202	0.259	0.488	0.232	0.035**	0.522	0.836	0.534
Cost reduction (CO)	0.082	0.168	0.624	-	0.407	0.928	0.688	0.722	0.341
Sex of HR respondent	0.345	0.043	0.000***	0.654	0.054	0.000***	-	0.778	0.035**
Designation	-	0.369	0.515	-	0.777	0.034**	-	0.027	0.070*
Awareness of fintech	0.058	0.319	0.857	0.688	0.722	0.341	0.149	0.357	0.676
Fintech tools adopted	0.559	0.392	0.155	0.522	0.836	0.534	0.082	0.168	0.624

Source: Authors' computation from field survey data (2024)

Notes: p-values are two-tailed. *** p < 0.01, ** p < 0.05, * p < 0.10.

The empirical evidence aligns closely with prior studies emphasizing the conditional nature of technology-driven performance gains. The positive profitability effects associated with fintech investment and usage experience corroborate with findings by Muawanah (2018), who showed that information

technology improves firm performance when supported by strong internal governance structures. Similarly, Chen and Tsou (2007) demonstrated that IT adoption enhances competitive advantage indirectly through service innovation, rather than through technology deployment alone. Ullah (2020) further supports this interpretation by showing that technology adoption improves organizational performance in the banking sector, although its effectiveness is moderated by contextual factors such as technological turbulence. Collectively, these studies reinforce the view that technology generates returns only when firms possess sufficient internal capacity, learning mechanisms, and managerial commitment, a pattern also evident in the present study.

Additional support for this interpretation is provided by Arjang et al. (2024) and Hasani et al. (2023), who emphasize on the roles of management support, staff training, and technological readiness in translating digital systems into measurable performance improvements. In the context of Tanzanian manufacturing sector, the insignificance of awareness and the number of fintech tools adopted suggests that mere exposure to fintech or superficial adoption is insufficient. Instead, profitability gains materialize when fintech adoption is accompanied by substantial investment and sustained operational use, highlighting the importance of depth rather than breadth of adoption. However, the results diverge from some strands of the available literature. Sawng et al. (2018) found that smart technology adoption among Korean export firms had limited effects on the overall performance, largely due to financial constraints and implementation challenges. This contrast underscores the role of capital availability and absorptive capacity in determining whether technology adoption translates into performance gains. Similarly, Nugroho and Anita (2023) reported that fintech adoption did not significantly affect financial performance in the banking sector, suggesting that sectoral characteristics and regulatory environments may condition fintech's effectiveness. In comparison, the present study's focus on manufacturing firms in a developing economy reveals that fintech adoption can yield substantial profitability gains when firms actively invest and accumulate experience. Thus, this study contributes new empirical evidence in the context of Tanzania, where there is a limited study on fintech adoption.

Overall, the findings suggest that fintech adoption enhances corporate performance not automatically, but through deliberate investment and learning processes. Firms that fail to adopt fintech, or adopt it superficially without adequate capital and experience, are unlikely to realize significant profitability gains. This reinforces the argument that fintech should be viewed as a strategic resource, rather than a standalone technological solution, and it highlights the importance of firm-level capabilities in shaping digital transformation outcomes within the Tanzanian manufacturing sector.

Conclusion

This study establishes the critical role of fintech adoption in enhancing corporate performance within the Tanzanian manufacturing sector, with profitability emerging as the principal outcome. The findings show that firms adopting fintech solutions such as digital payment systems, payroll automation, and related financial technologies achieve superior profit outcomes compared to non-adopters. Capital investment in fintech and accumulated experience in its use are identified as the most influential drivers of these gains, underscoring the importance of sustained financial commitment and learning-by-doing in realizing fintech-related benefits. While cost reductions contribute to improved efficiency, the results indicate that profitability improvements stem primarily from effective integration and sustained utilization of fintech rather than from cost savings alone. In contrast, firms that do not adopt fintech exhibit weaker and inconsistent profitability determinants, highlighting the strategic disadvantage associated with delayed or absent digital transformation.

Based on these findings, manufacturing firms are encouraged to prioritize fintech adoption as a strategic investment rather than a short-term operational tool. Firms should allocate sufficient capital to fintech initiatives, strengthen internal capabilities through training, and focus on sustained use of fintech systems to maximize performance gains. Policymakers and sector stakeholders are advised to facilitate this transition by providing supportive regulatory frameworks, targeted incentives such as tax reliefs or subsidies for fintech investments, and improved access to digital financial infrastructure. Such coordinated efforts would accelerate fintech diffusion, enhance firm-level competitiveness, and support the Tanzania's broader industrialization and economic transformation objectives.

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