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Assessing the Impact of Digital Transformation for Operational Cost Efficiency: Evidence from Kailali and Kanchanpur District of Nepal

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Abstract

This paper investigates the impact of digital transformation on operational cost reduction among the small business entities. The main aim of the paper is to calibrate the perceived impact of digital transformation on operation cost reduction. The study population is defined as the business entities operating for at least for last 12 months of the survey period in Kailali and Kanchanpur District of Nepal from which samples were selected using purposive sampling within the selected strata during the period January to April 2025 to fulfil study aim. Moreover, the cross-sectional survey data from 384 small business entities were collected to calibrate their operational efficiency in cost reduction using log-linear the regression model specified as the perceived efficiency in cost reduction is the function of level of digitization, operational efficiency, firm size, expansion of sales growth, share of digital payments, and firm age. The estimated results reveal that level of digitization ($\beta = 0.162$, $p < 0.05$), digital payments percentage ($\beta = 0.351$, $p < 0.01$). However, firm age shows a weakly positive influence ($\beta = 0.082$, $p < 0.10$), highlighting potential learning and experience effects. Obviously, firm size has inverse effect ($\beta = -0.337$, $p < 0.01$) on cost efficiency. This implies diseconomies of scale in managing larger firms. In conclusion, the findings underscore the central role of level of digital transformation, density of digital payment, life span firms contribute in reducing operation cost of business entity. This research contributes to fulfil evidence gap from the less-studied spatial context and expected to offer valuable insights to policymakers and practitioners seeking to rationalize the digital transformation of small business entities of Nepal.

Keywords: Digital transformation, Operational cost efficiency, Digital payments density, Regression analysis

JEL Classification Codes: O33, L25, M15

Introduction

Digital transformation (DT) is an integral component of Fourth Industrial Revolution (4.0) and embedded to each and every business entity across the national and global markets. In this context, DT has become a strategically imperative attribute for business entities seeking to reduce operational costs maintaining sustainability in competitiveness. Despite limited resources, business entities are not in the position to ignore DT shift due to its leverage on several aspects of business operations. Obviously, small business entities encounter both new opportunities and formidable challenges with the DT initiatives (Oyeyemi et al., 2024). Obviously, DT initiatives have redefined business organizational communication, business operation, and competition within dynamic business environments (Schallmo et al., 2018; Subedi et al., 2025). Essentially, DT encompasses a wide range of activities from social media engagement, e-commerce platforms, and cloud computing to mobile application and data analytics meant for resource optimization (Kraus et al., 2021; Westerman et al., 2014; Schneider & Kokshagina, 2021). Moreover, empirical studies across various business sectors including banking and fiancé, manufacturing, energy, and service sectors show that DT initiative has been the instrumentals to enhance cost efficiency through workforce productivity, and better asset utilization, with the variability in cost efficiency by industry conditions and firm capabilities (Shen et al., 2024; Tian et al., 2023; Teng et al., 2022). Therefore, DT of small business entities in relation to cost efficiency is increasingly relevant to national and global economic debates.

Fundamentally, DT initiatives are altering traditional business models, enabling smaller firms to streamline operations, broaden customer bases, and innovate in customer relations (Ross et al., 2019). However, adoption is hindered by barriers such as financial constraints, limited technological expertise, and inadequate organizational capacity (Jones et al., 2021; Avgerou et al., 2016). However, scholarly debate is ongoing phenomena to recognise the critical role of DT initiatives for business entities (Markus & Loebbecke, 2013). In this context, the Government of Nepal has promoted digital literacy, innovatil inform youon, and infrastructure through the formulation and implementation of Digital Nepal Framework 2019. Nevertheless, evidence on its effectiveness for small businesses remains limited. Moreover, business entities are central to sustainable economic development in Nepal, contributing to employment, poverty reduction, and regional growth. Yet, they face barriers such as inadequate infrastructure, limited market access, and restricted financial capacity. There

is consensus that DT offers potential solutions by enhancing efficiency, broadening markets, and improving customer interactions. However, the key problem in the limited understanding of how digital adoption affects the competitiveness and sustainability of small business entities in terms of operational cost reduction in the regions like Kailali and Kanchanpur district of Far Western Province of Nepal. Therefore, the main thrust of this research was to portray the impact of DT on operational cost reduction of small business entities meant for their resource optimization. Therefore, the pertinent research questions were; What is the perceived impact of DT to reduce operational cost of small business entities on behalf of entrepreneurs in the study area? How is DT impacting the operational cost reduction of small business entities in the study area?

This study was focused to bridge a critical gap by empirically assessing how DT affects the cost efficiency and sustainability of small business entities in Nepal. In this regard, existing research on the selected issue is found to be concentrated largely on large business entities and corporations, leaving a knowledge gap in the context of small business entities. This study responds to that gap through an empirical assessment of small business entities in the study area of Nepal, focusing on cost efficiency as a central outcome. Moreover, this research investigated the theme to assess the perceived contribution of DT for operational cost reduction of small business entities. Furthermore, it assesses the how and under what conditions DT drives operational cost reduction. Therefore, this paper analyzes how DT influences small business entities, focusing on its contribution to operational cost efficiency.

Theoretical Perspectives

Theoretical perspective is instrumental to have better insight on how a phenomenon exists or prevails. More importantly, it ensures that research is grounded in robust theoretical roots ensuring meaningful contribution on knowledge construction in the realm of academic world. In this regard, the Resource-Based View (RBV) and dynamic capability theory posit that DT enhances a firm's ability to optimize processes, and reduce cost stickiness thereby supporting cost reduction (Oduro et al., 2023; Santos-Jaén et al., 2023). Likewise, we can find the root of this study on Practice-Based View (PBV) as rooted in lean management and process optimization theories, directly impacting cost reduction by minimizing waste and maximizing resource utilization (Santos-Jaén et al., 2023). Moreover, PBV suggests that digital transformation practices, when aligned with operational strategies, significantly improve workforce productivity and asset efficiency, leading to lower operational costs (Tian et al., 2023). But, the current study approach is more congruent with Technology-Organization-Environment (TOE) framework for the navigation of this study. Therefore, based on the theoretical review, the researcher is selective to the Technology-Organization-

Environment (TOE) framework for the navigation of this study. Moreover, meta-analytic evidence supports and rationalizes the adoption of the TOE framework for the inclusion of the variables of interest, emphasizing that their interplay determines the extent of perceived efficiency in cost reduction.

Empirical Review

The empirical review is focused to the thematic review to test hypothesis that the perceived efficiency in cost reduction as the dependent variable and level of digitization, operational efficiency, firm size, share of digital payments, and firm age as predictors is grounded in several established theoretical frameworks.

Perceived Impact of Digital Transformation on Operational Cost Reduction

This review is focused to have beer understanding on digital transformation(DT) business entities are instrumental for operational cost reduction meant resource optimization. In this regard, a review of recent literature discusses several aspects regarding how DT is perceived to reduce operational costs across business entities. In this regard, studies show that cloud computing, automation, and Internets of Things (IoT) are consistently identified as the most impactful technologies for reducing operational costs (Anaba et al., 2024). The studies have estimated the contribution of automation and cloud solutions can yield average cost savings up to 30 percent, followed by significant contribution IoT for the reduction of maintenance and energy expenses (Borowski, 2021). Moreover, other benefits are cost reduction by optimizing inventory, streamlining processes (Saryatmo & Sukhotu, 2021), and enabling real-time decision-making digital supply chains (Wang et al., 2023) and data analytics further support cost reduction by optimizing inventory, streamlining processes, and enabling real-time decision-making (Anaba et al., 2024). Likewise, the studies have underscored another transmission channel of as digital transformation enhances workforce productivity, optimize asset utilization, and improves working capital efficiency, eventually leading to lower operational costs (Tian et al., 2023; Yu et al., 2022). Similarly, the studies have also asserted that digitalization, including digital twins and Artificial Intelligence (AI), reduces downtime, increases life-span of asset, and reduces operational costs by over 25 percent (Borowski, 2021). Therefore, reviewed literature strongly supports to set hypothesis that the perception that digital transformation significantly reduces operational costs of business entities to test hypothesis in the context of the study area of this study as:

Research hypothesis (H_1): Digital Transformation (DT) significantly to reduce operational cost of business entities in the study area.

Digital Payment Density and Operational Cost Reduction

The economic agents are overwhelmingly adopting digital payments including, reflecting its popular use for resources optimization. The studies have consistently shown that adoption of higher digital payment density is associated with increasing efficiency, reduction in operational cost by reducing labor and errors, and improving data management, through the improvement in overall efficiency. Moreover, empirical studies consistently find that higher intensity digital payment significantly reduces operational costs, through different transmission mechanisms. The studies of Go et al. (2025) and Calderon (2024) underscore that increased density of digital payments systems enhances streamline transactions, minimizes manual labour, and reduces processing times, leading to direct cost savings, eventually transaction efficiency (Saleh et al., 2025). Moreover, the study underscores that automation of digital payments significantly lowers human error in cash handling, thereby leveraging time of staff to focus on higher-value tasks making contribution in cost reduction (Musyaffi, 2024; Saroy et al., 2023). Likewise, studies argue that increased digital payment improves financial transparency, controls fraud and facilitates real-time monitoring, eventually reducing operational cost (Go et al., 2025). Essentially, higher intensity and density of digital payment networks as facilitated by the adoption of DT in business entities makes better integration across payment modes and yields greater cost efficiency (Ardizzi et al., 2019). Therefore, we can set hypothesis that the perceived intensity and density of digital payments significantly reduces operational costs of business entities:

Research hypothesis (H_2): Intensity and density of digital payments (DP)as facilitated by DT significantly to reduce operational cost of business entities in the study area.

Digital Transformation Enhancing Operational Efficiency and Cost Reduction

The empirical studies indicate that cost reduction is the function of operational efficiency of business entities with the mediating effect of DT. Adoption of DT is increasingly recognized as a critical driver for the reduction of operational cost of business entities. In this context, the study of Ojukwu et al. (2025) asserted that strategically DT adoption streamlines overall operational processes of business entities and eventually contributes to cost savings. Moreover, the studies of Sharabati et al. (2024) and Ekawaty et al. (2025) also concluded that DT enhances operational efficiency thereby reducing operational cost. In this regard, automation and cloud-based solutions as integral parts of DT are consistently and significantly enhancing operational efficiency contributing cost savings up to 30 percent by optimizing resource management (Tafra & Tankosić, 2025; Utami et al., 2024). Digital transformation empowers small business entities to achieve substantial operational

efficiency and cost reductions. The primary transmission mechanism through automation of work processes, cloud computing, and overcoming barriers over the time of business operation (Bobro et al., 2025; Kausar et al., 2025). This evidence strongly supports digital transformation as a pathway to sustainable efficiency gain and thereby reduction in cost. Therefore, the following hypothesis is set for testing:

Research hypothesis (H_3): Mediating effect of operational efficiency gain(OEG) and DT is significant on operational costs efficiency in business entities.

Mediating Effect of Firm Size and DT on Operational Costs Efficiency

Small business entities experiencing the greatest relative benefits due to their agility and enhanced by DT is regarded as a robust driver of operational cost reduction. Nevertheless, large firms also benefit, but to a lesser extent, as organizational complexity can limit efficiency gains (Teng et al., 2022). The exploration of optimal firm size to calibrate points for optimization is desirable for each and every business entity. In this regard, the study of DT on operational cost reduction with moderating effect firm as a control variable, showing intricate relation is essential. Theoretically, the larger firms reap benefits from economies of scale (Chen & Xu, 2023; Guo & Xu, 2021). Nevertheless, even small firms are also observed to be achieving higher efficiency in cost reduction due to flexibility and fewer management layers. The studies have consistently observed that DT is associated with the operational cost reduction across firms. However, there is variation in impact based on the firm size and context (Bobro et al., 2025). DT achieves cost savings through process automation, improved resource allocation, and enhanced transparency, which collectively reduce both internal and external transaction costs (Guo & Xu, 2021; Bobro et al., 2025). Therefore, the researcher has set the following hypothesis basis this thematic review:

Research hypothesis (H_4): Mediating Effect of Firm Size (FS) and DT is significant on operational costs efficiency in business entities.

Impact of Firm Life Span on Operational Cost Reduction

In general, the impact of age of a firm on operational cost reduction of business entities is intricate, showing a curvilinear and varying significantly by life cycle stage. The pertinent question is how is the impact of firm age with the mediating effect of DT on operation coat reduction with respect to firm age. Intuitively, Intuitively, with the mediation effect of DT, matured firms may face rigidities and expected to reduce costs. In this regard, a study by Bilal et al. (2025) shows that firm life span significantly influences operational cost structures. But, the relationship is sophisticated and

varies across life cycle stages and industries. Likewise, other studies have concluded that firm age significantly shapes operational cost reduction of business entities, with DT acting as a mediating factor that enhances efficiency gains (Belhadi et al., 2022; Shen et al., 2022). The impact of age of a firm on operational cost reduction of business entities is intricate, showing a curvilinear and varying significantly by life cycle stage (Li et al., 2024). In this regard maturity can bring efficiencies, meaning that older firms may face rigidities that increase costs and hinder innovation. Likewise, studies reveal that the age of the with 6-10 years, with digital adoption are able to achieve up to 20 percent efficiency in cost reduction through optimization (Chen et al., 2024; Yoo et al., 2019).

Research hypothesis (H_5): Mediating Effect of age of firm (AF) and DT is significant on operational costs efficiency in business entities.

Thus, based on the empirical review, the researcher has gained evidence based insight to test hypothesis that the level of digitization, digital payment density and intensity, operational efficiency and firm size, and firm age significantly impacts the operational cost reduction of small business entities in the study area.

Conceptual Framework

Based on the literature review, researchers have drawn insights to draw conceptual framework for the analysis that presented below:

Figure 1

Digital Transformation and Operational Cost Efficiency

Source: The authors have developed the conceptual framework based on the theoretical and empirical literature review.

The framework presented above clearly displays the various elements that contribute to the operational cost efficiency, due to DT within small business entities, highlighting how these factors interact to impact both operational efficiency of business entities and its linkage with level of digitization, digital transaction density, firm size, life span of firm in Nepalese context.

Methods and Materials

Research Design

The study is predominantly quantitative followed by the qualitative interpretation of the estimated result. Similarly, based on the number of contact with respondents, it follows cross-sectional research survey design. Moreover, a structured survey questionnaire for a representative sample of small business entities across various sectors in the Kailali and Kanchanpur district was selected for data collection. The survey was focused on gathering quantitative data on factors such as perceived contribution of DT for operational cost reduction, operational efficiency, percentage of digital payments, and estimated sales growth. Likewise, data regarding level of DT, perceived cost reduction with mediating effect of DT, perceived percentage of digital payments from total payments, operational efficiency gain due to DT, firm size and life span of selected firms.

Research Philosophy

The current study is grounded in the post-positivist research paradigm, which recognizes an objective reality while acknowledging the inherent limitations of empirical inquiry. Moreover, it adopts critical realism ontological perspectives to systematically examine the impact DT on cost reduction of small business entities. Moreover, the current study adopts post-positivist epistemology with pragmatic elements which underscore that the knowledge is evaluated based on its practical usefulness and efficacy of problem solving. In this context, it also acknowledges both observable and measurable outcomes, in terms of perceived change in operational cost with other covariates such as level of DT, percentage of digital payments, operational efficiency gain, firm and firm size. Moreover, the current research seeks to understand the firms' endeavors to improve operational efficiency and ethical considerations by ensuring accuracy, confidentiality, and respect for participants' perspectives. In axiological perspectives, the research acknowledges value-aware and controlled position as it influences topic selection and policy interpretation. However, it asserts

that objectivity is maintained through transparent procedures, rigorous empirical analysis, and minimizing researcher bias. Finally, it adopts a deductive approach pre-dominantly a quantitative method followed by qualitative interpretations of the findings.

Population and Samples

The population for this study comprises all the small business entities that have undergone DT initiatives operation in the study area. The sample for this research were selected purposive sampling method, which involves selecting cases based on their relevance to the research objectives. According to Carrier et al. (2004) formula for determining sample size(n) when population size (N) is large and the desired level of precision (margin of error, M is specified) is given by:

…(1)

In the above equation (1) above, 'n' indicates sample size and Z denotes for Z-score corresponding to the desired level of confidence (usually based on the standard normal distribution, e.g., for a 95% confidence level, Z = 1.96). Moreover, p and q stand for estimated proportion of the population with the characteristic of interest (if unknown, a common practice is to use 0.5, which maximizes the sample size for a given margin of error) and desired margin of error (expressed as a proportion) respectively. Moreover, the sampling strategy was purposive sampling within the selected strata during the period January to April 2025 to fulfil study aim, wherein small business that have undergone DT initiatives were selected based on their relevance to the research objectives.

Methods of Data Collection

The structured survey questionnaire was administered to collect relevant data to fulfil the research objectives. Essentially, the structured questionnaire was used to survey small business owners to assess their experiences, perceptions, and challenges regarding DT adoption. The structured questionnaire was administered via Google form.

Methods and Tools of Data Analysis

The data gathered using Google form were recorded in excel for further meaningful analysis. In this regard, the study has collected predominantly quantitative data using close ended questions followed by the open ended questions were also used to collected relevant data relating to open view of small business entities entrepreneur regarding digitization experience. Therefore, quantitative data are analyzed using regression analysis.

Variables and Their Measurement

The current study has used altogether six variables of interest based on research questions mentioned in earlier section. Their operational definition and measurements are described hereunder:

Table 3.1

Operational Definition of Variables used in the Regression Analysis

Variable Code	Operational Definitions	Nature of Variables	Measurement Scale of Variables
OCR	Operational Cost Reduction	Outcome Variable	Ratio
DT	Digital Transformation	Independent Variable	Categorical
DP	Digital payments density	Independent Variable	Ratio
OEG	Operational Efficiency Gain	Control Variable	Ratio
FS	Number of Employee in the Firm	Control Variable	Ratio
AF	Age of Firm	Control Variable	Ratio

Specification of Regression Model

The basic linear regression model for the analysis of the data set in matrix form to calibrate the contribution of DT on the operational cost reduction small business entities of Nepal could be specified as:

$$OCRi=Xi\beta i+Zi\gamma i+ \mu i \quad \ldots(2)$$

In the above equation (2) above OCR_i refers to the operational cost reduction of ith firm. Likewise, Xi and Zi refers the vector of independent variables and vectors of control variables relating to 'i' th the business firm. Moreover, βi, and γi denote to estimated coefficients of the all category of variables i.e. independent, control variables and μi stands for error term respectively The acronyms given in the model are defined in Table 1 above.

The regression equation specified in equation (2) in matrix form can be presented in log-linear form as follows:

$$\text{Ln OCR}=\beta_0+\beta_1(DT) +\beta_2\text{Ln (DP)}+\beta_3\text{Ln (OEG)}+ \beta_4 \text{ Ln (FS)} +\beta_5 \text{ Ln (AF)} + \quad \ldots(3)$$

In equation (3) above, β_0 denotes intercept and $\beta_1, \beta_2, \ldots \beta_5$ are the slope coefficients to be estimated. Likewise, stands for residual of error term. The acronyms given in the model are defined in Table 1 above.

Results and Discussion

The estimated empirical results are presented and discussed from Table 2 to Table 5 subsequently.

Regression Analysis Result

Table 2 below presents regression analysis result of the proposed econometric model specified in the equation 1. In the regression equation, perceived operational cost reduction is dependent variable and level of digitization, operational efficiency, firm size, expansion of sales growth, percentage digital payments of total transaction, and age of firms are independent variables.

Table 2

Estimated Result Regression Model

Dependent Variable: Operational Cost Reduction			
Variable	**Coefficient**	**Std. Error**	**t-Statistic**
DT	0.162**	0.080	2.030
LnDP	0.351***	0.061	5.747
LnOEG	0.065	0.064	1.029
LnFS	-0.337***	0.058	-5.826
LnAF	0.082*	0.046	1.783
Constant	0.007	0.085	0.087
R-squared	0.441		
Adjusted R-squared	0.432		
F-statistic	49.398		
Prob(F-statistic)	0.000		
D-W Statistics	1.770		

Note. Table 2 above shows the estimated regression model 2.

Data Source: Field Survey, 2025. Data Source: Field Survey, 2025. Significance Levels: ***p < 0.01; **p < 0.05; p < 0.10.*

Table 2 above shows the estimated log-linear regression model. The result shows that approximately 44.1 percent of the variation in perceived efficiency in operational cost reduction is explained by the explanatory variables included in the model as reflected by R^2. Likewise, the adjusted R^2 value is 43.2 confirms a moderate fit after accounting for degrees of freedom. Moreover, the F-statistic of 49.39 with a p <0.01 implies that the estimated model is statistically significant, reflecting the explanatory variables jointly have a meaningful impact on operational efficient to assess the cost reduction of the

small business entities in the study area. Finally, the Darwin-Watson (D-W) statistic of 1.77 remains with acceptable range and indicate that there is no raise serious issue of autocorrelation.

Table 2 also displays estimated of regression model shows that digitization (DT) positively and significantly influences cost reduction efficiency at the 5 percent statistical significance level. In other words, a 1percent increase in digitization is associated with a 0.162 percent ($p<0.05$) improvement in cost reduction efficiency. This supports the claim that digital technologies reduce operational costs. This finding is also supported the several previous studies as the digitization significantly enhances for ensuring cost efficiency in firms (Tian et al., 2023; Yu et al., 2022). Similarly, density of digital payments (DP) has significant impact on cost efficiency, implying that increased DP (0.351, $p<0.01$) is associated with increase in the intensity of cost reduction. This may reflect that increased density of digital payments systems enhances streamline transactions, minimizes human error in cash transactions, and reduces the transactions processing times, leading to direct cost savings, eventually transaction efficiency. This result is also aligned to the previous study of Go et al. (2025), Saleh et al. (2025) and Calderon (2024) underscoring that increased digital payment improves financial transparency and facilitates real-time monitoring, eventually contributing to reducing administrative cost and fraud.

Likewise, larger firms as measured by number employees are associated with lower cost reduction efficiency. This suggests possible diseconomies of scale as depicted by negative sign of coefficient (-0.337, $p<0.01$), where managing costs becomes harder as the workforce grows and the highly significant at 1 percent level. Conversely, Wamba et al. (2017) study has contrasting result as it reported that larger firms often benefit more from DT due to resource availability, contrary to the negative effect of size found in this study.

Moreover, the result shows that age of firms(AF) with mediating interaction with DT also contribute to reduce operational cost with slower magnitude and intensity (0.080, $p<0.10$). In this regard, the study of Cowling et al. (2024) and Ramaswamy et al. (2020) align with result and suggested older firms gain cost efficiency through learning effects. Conversely, Wang et al. (2023) mixed effect and argued that younger firms' agility in digital adoption may offset this advantage in tech-driven sectors.

Result of Hypothesis Test

Table 3 below shows the hypothesis test result based on coefficient value and corresponding statistical significance in terms of probability value of estimated regression model.

Table 3

Summary Table for Hypothesis Test Result

Statement of Hypothesis	P-Values	Acceptance and Rejection
DT significantly reduces Operational Cost	<0.050	Acceptance of H_1
DP significantly reduces Operation Cost	<0.001	Acceptance of H_2
OEG significantly reduces Operation Cost	<0.304	Rejection of H_3
FS significantly reduces Operation Cost	<0.001	Acceptance of H_4
FA significantly reduces Operation Cost	<0.100	Acceptance of H_5

Note. Table 3 above shows summary result o hypothesis test based on the the estimated output of regression model 3.

Evidently, Table 3 shows that first two research hypothesis are accepted the regression model. Moreover, the accepted research hypotheses are digital transformation(DT) and density of digital payments (DP)of business firms significantly reduces the operational cost of the firms. Likewise, firm size(FS) has significant impacts on the operational cost with the mediating effect of DT. However, the firm age (FA) has minimal impact on operational cost. But, operational efficiency gain via DT has no impact of cost reduction.

Variance Inflated Factor

In regression analysis, the Variance Inflation Factor (VIF) is a commonly used diagnostic for detecting multicollinearity among explanatory variables. Table 4 below shows variance Inflation Factor (VIF) values for the estimated model.

Table 4

Variance Inflated Factor

Variable	Coefficient Variance	Centered VIF
DT	0.006	1.859
LnDP	0.004	1.551
LnOEG	0.004	2.168
LnFS	0.003	1.209
LnAF	0.002	1.257

Note. Table 4 above shows the estimated VIF for regression model 2.

Data Source: Field Survey, 2025.

Evidently, Table 4 above shows that the centered VIF values for all variables LnDT (1.859), LnOEG (2.168), LnFS (1.209), LnDP(1.551), and LnAF (1.257) and all are well below the critical threshold of 10, suggesting no serious multicollinearity issues. Therefore, the centered VIFs confirm that the estimated regression coefficients are stable, and the model does not suffer from any issue of multicollinearity that would distort the interpretation of the variables.

Conclusion and Policy Implication

This study examined the relationship between digital transformation and operational cost efficiency among small business entities in Kailali and Kanchanpur districts of Nepal using firm-level survey data and a log-linear regression framework. The main thrust of this paper was to assess the perceived impact of DT on operational cost reduction of small business entities meant for their resource optimization. The findings clearly show that DT plays a meaningful role in reducing operational costs. Particularly, higher levels of DT and a greater density of digital payments are strongly associated with improved cost efficiency, indicating that digital tools help streamline business operations, reduce transaction-related operational cost, and enhance process coordination. The weakly positive effect of firm age suggests that accumulated experience and learning over time may support more effective use of digital technologies. Conversely, the negative association between firm size and cost efficiency highlights potential diseconomies of scale among comparatively large size firms, possibly due to managerial complexity and coordination challenges that are not fully offset by digital adoption. Therefore, these results suggest that DT alone does not automatically guarantee efficiency gains unless it is complemented by appropriate managerial and organizational practices. Overall, the current study contributes empirical evidence from a relatively underexplored Far Western Province context of Nepal and reinforces the importance of targeted digital strategies for small businesses entities. Finally, the findings offer practical insights for policymakers and practitioners in designing context-specific digital support programs aimed at enhancing cost efficiency and long-term competitiveness of small business entities.

Limitations and Delimitations of the Study

Identifying the delimitations and limitations is essential for clarifying the scope and constraints of this research.

Delimitations

The study is intentionally bounded as delimitations to ensure focus. They are as follows:

- Firstly, it is confined to Kailali and Kanchanpur districts of Far-Western Provenance of Nepal due to resource constraints.
- Secondly, the current study is confined to only small business entities, excluding large enterprises.
- Thirdly, the data were collected during the period January to April 2025, that only provides a snapshot of DT and provides inter-temporal perception rather than long-term impacts.
- Finally, the study applies a predominantly quantitative approach followed by qualitative analysis of observed data.

Limitations

Limitation refers to the certain factors that lie outside the researcher's control. Moreover, the study is not able capture some aspects due to its limitations feasibility as termed as study limitations. They are as follows:

- Firstly, the findings from the two districts may not represent all of Nepal, given differences in infrastructure and digital readiness.
- Secondly, limited resources may restrict sample size, affecting representativeness.
- Thirdly, the social desirability bias from the side of respondents can be refuted that might distort responses.

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Conflict of Interest

We affirm that there is no conflict of interest regarding any matters.

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