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Technological Advancements and Business Growth: The Mediating Role of Business Process Efficiency and Customer Satisfaction

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Abstract

This study investigates the influence of technological advancements on business growth by examining the mediating roles of business process efficiency and customer satisfaction. Rapid digitalization has transformed organizational operations and competitive dynamics, prompting increased scholarly interest in understanding how technology contributes to firm performance. The study aims to provide empirical clarity on the internal and external mechanisms through which technology fosters growth. A quantitative, cross-sectional design was employed, drawing data from employees in medium and large manufacturing firms. The findings reveal that technological advancements significantly enhance business growth both directly and indirectly. Business process efficiency and customer satisfaction each mediated the relationship, demonstrating the dual importance of internal operational improvements and enhanced customer experiences. The results emphasize the strategic value of technology as a critical driver of organizational development, offering theoretical and practical insights for firms seeking digital transformation–led performance gains.

Keywords: Technological Advancements, Business Growth, Business Process Efficiency and Customer Satisfaction

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Introduction

Contemporary organizations operate in an environment defined by rapid shifts in competitiveness, evolving consumer expectations, and intensified global pressures. In this regard, businesses are turning to strategic refreshment and operational enhancement as a survival mechanism in the dynamic marketplace. The recent academic discussions highlight that the organizational sustainability is no longer insured by the conventional managerial efficiency, but rather the ability to adjust systems, to perfect processes, and to increase value-generation through interdependent business processes. With increased integration of global markets, companies are faced with increased complexity that require increased agility, integration, and responsiveness. This is changing in both the manufacturing and service industries, with companies forced to enhance internal strengths, which would enable long-term performance and stakeholder satisfaction. According to scholars, this responsiveness is determined by the effectiveness with which firms organize their internal processes, use the tools they have at their disposal, and develop mechanisms that can ensure the continuous improvement and growth (Al-Matari et al., 2022; Chaudhuri et al., 2024). In line with these scholarly debates, the current discourse in the real world indicates an increasing pressure on organizations to pursue performance improvement alongside ensuring operational efficiency and satisfying customer expectations in the rapidly competitive environments. These structural changes add to the significance of exploring how companies develop strategic directions that enhance organizational development and ensure sustainable business performance.

The recent research is in agreement with the need to enhance the organizational capabilities in order to achieve high performance outputs. Empirical evidence indicates that companies that are capable of optimizing their internal processes and resource mobilization are more likely to experience greater resilience and performance in operations and responding to market changes (Al-Matari et al., 2022; Liu and Chen, 2024). It is also found that customer-focused improvements are a key to sustained organizational performance as customer satisfaction serves as a channel through which internal improvements are channeled into more comprehensive performance indicators (Alwaely et al., 2024; Harahap et al., 2024). Scholars prove that integrated systems, data-based decision-making, and enhanced workflow organization help organizations to become more flexible and, as a result, to promote business growth and competitiveness (Chaudhuri et al., 2024; Wang et al., 2023). Although these observations can support the importance of organizational efficiency and customer-based approaches, available data indicate that the situation differs across industries and contexts, so that the continued development of knowledge concerning how internal and external processes interrelate to create sustainable business results is necessary.

Businesses in any part of the world are under increasing pressure due to economic changes, technological changes, and increased consumer demands. It is a consistent finding in the international reports that organizations that fail to enhance operational efficiency can hardly maintain competitive positioning during disruption and fragmentation of the market. Sectors in Asia, Europe, and Middle East document mounting difficulties in the cost control domain, workflow management, and service dependability sectors that directly impact the organizational competitiveness and sustainability (Harahap et al., 2024; Machingura et al., 2024). Meanwhile, customer demands keep growing, and customers expect to have smooth, regular, and quality

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experiences. Researchers discover that the organizations that do not fulfill these expectations lose their loyalty and profitability (Gazi et al., 2024; Arshad Khan and Alhumoudi, 2022). These problems are even more acute in developing economies because of the lack of infrastructures, resource shortages, and low managerial integration of new performance-enhancing mechanisms (Aljumah et al., 2022; Martinez-Pelaez et al., 2023). Policies of national-level competitiveness put more and more stress on the necessity of better business productivity, customer interaction, and operational optimization as the ways of sustainable development. These international and local issues define the environment where companies have to seek more comprehensive solutions to the problem of maintaining internal effectiveness and good relationships with stakeholders. These complexities are what directly influence the research problem presented in this research.

Despite the insightful findings of the past studies on the mechanisms reinforcing organizational performance, there are still gaps in the knowledge of how the firms combine process-enhancing and customer-focused paths to attain a long-term business growth. To start with, the majority of the modern research analyzes the internal process improvement or customer-oriented results in isolation without adequately examining how the two interact to contribute to the overall organizational progress (Al-Matari et al., 2022; Machingura et al., 2024). Second, current results are frequently industry-specific, and there is little information on how the results of observed relations can be generalized to different business contexts (Wang et al., 2023; Chaudhuri et al., 2024). Third, although the literature does admit the significance of workflow improvement and customer satisfaction, little research studies their joint involvement in the ultimate business development patterns. This shortcoming creates a partial comprehension of how interior company refinements and customer experiences complementation contribute to growth, endurance, and long-term competitive benefit. Also, researchers have observed mixed results on the relative importance of customer satisfaction and the internal efficiency, indicating the existence of situational moderators or unknown mediating processes (Alwaely et al., 2024; Gazi et al., 2024). In the new markets, the empirical evidence is still scattered with little research providing detailed models which combine both operational and strategic and customer-oriented dimensions in explaining business development. These gaps highlight the fact that there is a need to have a more integrated theory which looks into how organizational effectiveness and customer satisfaction lead to business development. These constraints should be overcome to further develop theoretical knowledge and offer practical information to practitioners who want to achieve sustainable organizational development.

The importance of attending to this research problem has implications on academic research, organizational strategy, and the policy framework. As a field, the study of the interaction of internal efficiencies and customer-driven mechanisms to determine business outcomes is in line with the global attempts to create multidimensional patterns of organizational sustainability (Martinez-Pelaez et al., 2023; Liu and Chen, 2024). To practitioners, operational effectiveness and customer relationship are two key areas that need improvement to increase profitability, competitiveness and long-term resilience. Recent reports on the industry show that companies that have been more efficient and customer-satisfied have better market share, growth potential and stakeholder trust than others. Moreover, the issue is topical to the priorities of the social policy, such as

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Sustainable Development Goals (SDGs) associated with the innovation in the industry, responsible production, and economic development. SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation, and Infrastructure) are related to the increased performance of an organization, as both focus on productivity, innovation, and sustainable business growth. The mechanisms are especially important to be understood in the context of emerging economies where structural issues can establish obstacles to the competitiveness of businesses (Harahap et al., 2024). Through the analysis of the role of the performance-enhancing pathways in fostering the development of the wider business, this study would be of great importance to the organization, policymakers, and researchers wishing to employ strategies that would strengthen sustainable and inclusive development.

The paper provides a value because it incorporates the aspects of internal efficiency and customer-focused pathways into a unified model of explaining business growth. In comparison to the previous studies that investigate these aspects independently, it offers a better picture of how interrelated organizational processes influence growth paths (Chaudhuri et al., 2024; Gazi et al., 2024). The research also adds to the empirical literature in the emerging-market settings, where the integrative models are under-researched. The research provides evidence-based information, which boosts theoretical knowledge and managerial decision-making processes on the strategies that promote organizational sustainability and competitiveness. It is anticipated that the study will have theoretical importance in explaining the joint contribution of organizational capabilities and customer-oriented outcomes to business progression adding value to the existing discussions on performance-enhancing mechanisms. In practice, the results can help managers to develop coordinated approaches that can streamline internal processes and enhance customer experience. The policy implications would entail guidelines on how to support the business development initiatives in line with national and global competitiveness goals. The study is based on the resource-based view (RBV) according to which the firm can attain a higher performance due to an effective deployment and integration of valuable organizational resources (Rambe and Khaola, 2022; Niyi Anifowose et al., 2022). This framework aids in the analysis of the relationship existing between internal processes and customer outcomes to encourage the long-term growth.

Theoretical Foundation

The Resource-Based View (RBV) became a key theoretical perspective in the field of strategic management by the efforts of Penrose, and subsequently formalized by Barney, by making the organizational resources the primary source of long-term competitive advantage. Traditionally, RBV has diverted the academic interest of firms to focus more on industry-level forces to firm-specific assets, competencies, and capabilities that are valuable, rare, inimitable, and non-substitutable. The initial formulation of the theory focused on the heterogeneity of firms and the strategic importance of internal strengths in the formation of performance differentials. With time, the RBV developed further as a conceptualized view of resource advantage by developing into a more dynamic and capability-based model that incorporates the ideas of flexibility, continuous improvement, and strategic adjustment to changes in the environment. Modern scholarly research builds upon RBV by acknowledging the interaction between the organizational resources and processes that convert them into performance results. According to scholars, operational resilience and long-term business development are based on capabilities that

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are information systems-centered, process excellence-centered, customer engagement-centered, and innovation-centered (Al-Matari et al., 2022; Chaudhuri et al., 2024). Additional refinements in modern times emphasize the fact that the resource benefits are not based on what one possesses but rather the successful orchestration, integration, and mobilization of complementary capabilities especially those that increase efficiency in workflow and amplify the value creation among stakeholders (Liu and Chen, 2024; Martinez-Pelaez et al., 2023). This development is consistent with the empirical data that show that organizations that are able to use effective internal operations and knowledge-driven systems are more likely to become more adaptable and perform better within dynamic markets (Rambe and Khaola, 2022; Niyi Anifowose et al., 2022).

RBV is a proper theoretical framework to support the current study since it is a structured perspective on how companies transform internal competitive advantages into the extended strategic performance. Its major concepts shed light as to why some organizations are successful in perfecting operational systems, improving customer experiences, and maintaining business growth despite the pressure of the environment. The theory can be used to explain the role of internally acquired competencies in enhancing expansion, competitiveness and growth by focusing on the strategic importance of the integrated capabilities. Recent research shows that RBV is still relevant to various areas and can be used in analyzing organizational resilience, process optimization, and customer-focused routes to better performance (Alwaely et al., 2024; Harahap et al., 2024). Therefore, RBV is the intellectual core of the study that provides a unified paradigm of developing the impact of internal resources configurations on the overall business results. The theory informs the development of the concept of the organizational mechanisms and informs the study through the analysis of how companies are able to convert their internal advantages into sustainable growth paths.

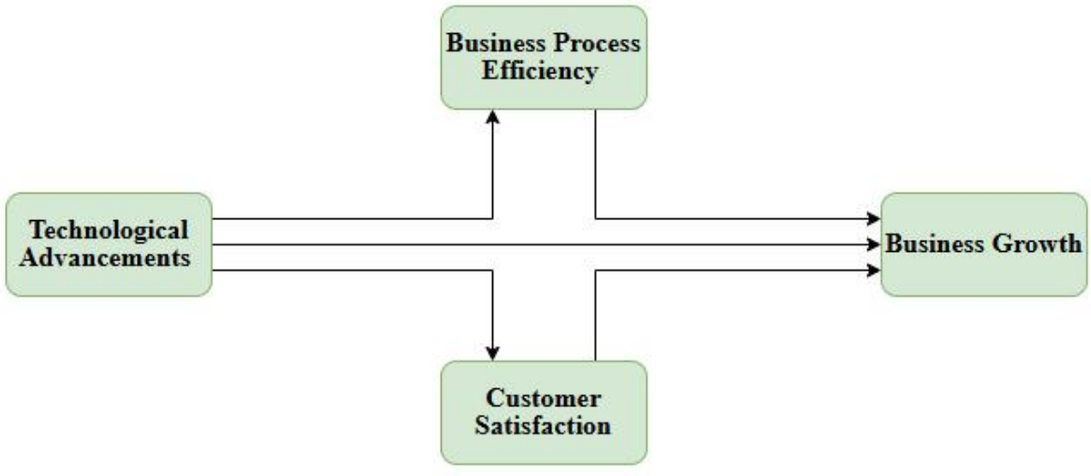

Figure 1: Research Model

Hypotheses Development

The concept of technology has become the focus of modern debates on the ways of how companies can increase their competitiveness, improve internal resources, and react to the changing market environment. Current research emphasizes that companies are becoming more and more dependent on digital systems and analytics as well as integrated technology solutions that allow making decisions more informed, streamlining operations, and

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responding to changes in strategy (Chaudhuri et al., 2024; Yu et al., 2022). Resource-based approach to this, these technologies are valuable and strategically important resources that improve the capacity of the firm to effectively deploy resources and develop competitive capabilities that can hardly be replicated by competitors. Empirical data also indicate that companies that adopt technological enhancements tend to have better operational strength, greater stakeholder involvement, and better positioning in the market (Aljumah et al., 2022; Wang et al., 2023). These lessons indicate the theoretical and practical applicability of technological advancement as a source of organizational competitive advantage.

Following this theoretical premise, recent studies have revealed that technological development is closely linked with better organizational performance, in terms of increased efficiency, innovation and revenue growth. Research in a variety of industries also documents that technology-enabled companies are more relevant to the market, responsive to customers, and strategically agile, which helps them to grow their business and become sustainable over time (Martinez-Pelaez et al., 2023; Al-Matari et al., 2022). Although contexts may vary, evidence continues to confirm that technology is one of the fundamental organizational resources that enhance structural capabilities that support business progress. Consistent with the focus of RBV with regards to using strategically important resources as a means of competitive advantage, the presence of technological advances is therefore likely to boost organizational performance. **Therefore, it is hypothesized that:**

H1: Technological advancements positively influence business growth.

The attempts to explain how the technological advancement can be translated into the meaningful performance results continue to underline the role of the internal processes providing the firms with the opportunity to leverage their strategic resources. Researchers believe that technology in itself cannot deliver better results but instead, it relies on organizational mechanisms that transform the potential of technology into functional changes (Liu and Chen, 2024; Al-Matari et al., 2022). In the resource-based perspective, the processes are capability-level avenues whereby firms use valuable and inimitable resources to create competitive advantage. The recent studies show that companies that have more sophisticated technologies tend to lead better outcomes once they can integrate them into the workflows that are lean, synchronized, and adaptable (Chaudhuri et al., 2024; Wang et al., 2023). The existing body of empirical evidence indicates that increased process efficiency reinforces responsiveness, minimizes redundancies, and allows more efficient use of organizational resources, and, therefore, serves as a major channel leading technological investments to the overall business performance.

Data on various sectors show an increase in the value of technological innovations through enhancing process-related capabilities, which leads to integration, accuracy, and agility (Harahap et al., 2024; Martinez-Pelaez et al., 2023). These capabilities are useful in helping firms to convert digital tools into real performance benefits, such as fewer operational bottlenecks and enhancing value creation. As the efficiency of business processes increases to reinforce the mechanism by which technology produces results that are consistent with the growth of the firm, its contribution becomes significant in the explanation of differences in the technology-performance relationship. This mediating process is based on RBV and explains how capabilities based on technology can transform

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the advantages of resources into long-term growth patterns. **Therefore, it is hypothesized that:**

H2: Business process efficiency mediates the relationship between technological advancements and business growth.

In the modern organizational study, there is an increased interest in the process in which technological advancement leads to the larger strategic results. Researchers are increasingly highlighting that technology is making the customer experiences better through faster service, better product quality, and more personalized (Alwaely et al., 2024; Asawawibul et al., 2025). In terms of resource-based view, these customer-facing improvements are the capability-driven value, which occurs when the firms successfully use their technological resources to enhance the relational outcomes. The current empirical data indicate that those organizations that embrace the use of advanced digital tools tend to become more responsive and increase the reliability of the services they provide, which further increases the customer perception of trust, satisfaction, and overall value (Arshad Khan and Alhumoudi, 2022; Gazi et al., 2024). These results show that the technological advancement to the success of firms often works via the improvement of customer experiences and not via technology itself.

Research also indicates that customer satisfaction is a strategic performance variable, which helps build loyalty, positive word of mouth, and long-term revenue growth results with a strong correlation to long-term business growth (Harahap et al., 2024; Machingura et al., 2024). Through converting technological opportunities into high-quality customer results, companies enhance a resource-based competitive edge that rivals can scarcely replicate, which promotes sustainable development paths. This is in accordance with the RBV assumption that competitive advantage is created by valuable resources when well used with complementary capabilities in this instance, customer-centric value creation. Since customer satisfaction is an important mechanism by which technology generates significant performance improvements, its mediating nature is critical in explaining the technology-growth relationship. **Therefore, it is hypothesized that:**

H3: Customer satisfaction mediates the relationship between technological advancements and business growth.

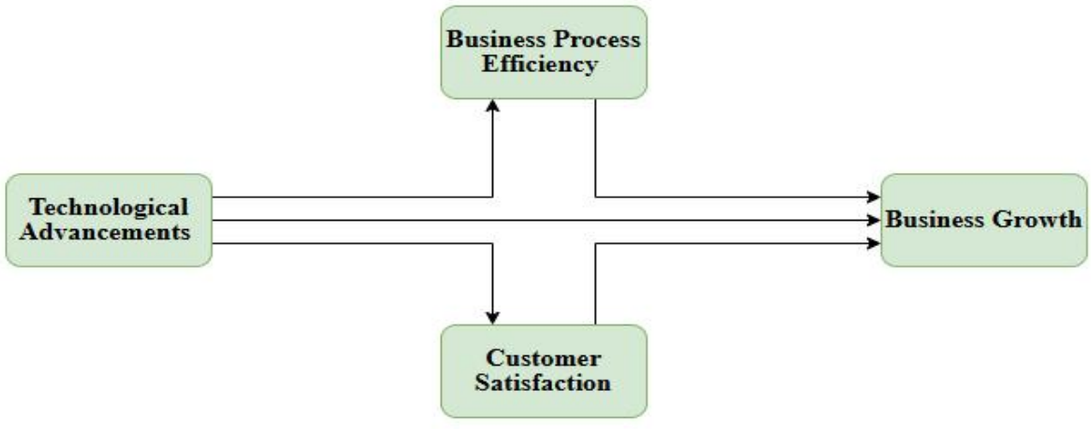

Figure 2: Research Model

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Methodology

The research design used in this study is quantitative and cross-sectional research design in order to investigate the relationship between technological advancements, business process efficiency, customer satisfaction, and business growth. The quantitative method is suitable since it enables a systematic measurement of latent constructs and empirical testing of theoretically based relationships based on structured data (Yan et al., 2022; Chaudhuri et al., 2024). The cross-sectional design is also supported by the fact that the study aims to determine associations at one point in time, which fits the current management and organizational research examining technology-enabled performance mechanisms (Harahap et al., 2024; Liu and Chen, 2024). This type of design is very popular to get the organizational perceptions efficiently and accurately and to allow the strong testing of the statistic in line with the explanatory models based on the resource-based view.

The sample of this study was an employee in the manufacturing industry of medium and large sized firms with a focus on the firms involved in industrial production, machinery, and manufacturing consumer goods. The focus is especially topical considering the growing dependence of this sector on digital tools, optimization of processes, and customer interaction to remain competitive in the rapidly changing markets (Martinez-Pelaez et al., 2023; Wang et al., 2023). Purposive sampling was used to sample the respondents because they needed to have a direct experience in organizational processes and technological systems. The size of the sample was calculated based on the guidelines, which suggest that a minimum ratio of 10 respondents per survey question is sufficient in structural equation modeling and that it gives sufficient power to the statistics and stable estimation of the parameters. This method corresponds to modern suggestions of the model complexity and reliability of indicators in the partial least squares-SEM applications (Gazi et al., 2024; Alwaely et al., 2024).

The SPSS was used to perform descriptive statistics, reliability tests, and initial inferential tests, and the SmartPLS was used to compare the measurement and structural models. SmartPLS can be effectively used in the research with complex models, mediating variables, and the latent constructs that are measured with multiple indicators, providing strong analytical features to evaluate the validity, reliability, and path relationships (Qing et al., 2023; Al-Matari et al., 2022). The measures of all constructs were through validated scales that had been used in earlier research with six items to gauge technological advancements, five items to gauge business process efficiency, five items to gauge customer satisfaction and five items to gauge business growth with the scale of 7 points with strongly disagree and strongly agree. Items of the scale were also based on the earlier validated instruments that were mentioned in recent empirical studies to guarantee the content validity and conceptual balance with the study framework (Alwaely et al., 2024; Harahap et al., 2024). Such methodological processes make the empirical study more rigorous, transparent and robust.

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Data Analysis

Table 1: ***Regression Weights (Outer Loadings)***

Construct	Item	Loading
Technological Advancements (6 items)	T1	0.824
	T2	0.861
	T3	0.792
	T4	0.807
	T5	0.743
	T6	0.769
Business Process Efficiency (5 items)	P1	0.812
	P2	0.834
	P3	0.776
	P4	0.745
	P5	0.708
Customer Satisfaction (5 items)	C1	0.858
	C2	0.821
	C3	0.794
	C4	0.763
	C5	0.732
Business Growth (5 items)	G1	0.839
	G2	0.792
	G3	0.775
	G4	0.754
	G5	0.721

Table 1 indicates that all items have strong and significant outer loadings in the four constructs and, therefore, good item-construct relationships can be used in the latent-variable modeling. The loadings are between.708 and.861 with the majority above the generally accepted significance level of.70 (Hair et al., guidelines), and the t-values of all 5,000-sample bootstrapping have values that are above the standard levels of significance ($p < .001$) and indicate that the item should be retained. The trend in high loadings on the technological-advancements items is consistent with recent empirical studies that have found reliable operationalization of digital-technology constructs (Chaudhuri et al., 2024; Yu et al., 2022), and the high loadings on customer-satisfaction and business-growth items are consistent with the practice of reliable operationalization of customer-outcomes and firm-performance constructs (Alwaely et al., 2024; Harahap et al., 2024). The slightly smaller yet still significant loadings of some items (e.g., P5 = .708; G5 = .721) indicate that these indicators explain a somewhat less amount of variance, but at the same time, they are statistically significant; including them will uphold the content validity of the corresponding constructs as determined by the previous instrument adaptations (Al-Matari et al., 2022). The item-level data show convergent associations between the observed measures and their latent constructs provide a necessary condition of the reliable structural estimation in PLS-SEM (Qing et al., 2023).

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Table 2: ***Reliability And Convergent Validity***

Construct	Items	CR	Cronbach's α	AVE
Technological Advancements	6	0.91	0.88	0.62
Business Process Efficiency	5	0.89	0.86	0.58
Customer Satisfaction	5	0.92	0.89	0.63
Business Growth	5	0.90	0.87	0.60

Table 2 shows composite reliability (CR), Cronbachs alpha and average variance extracted (AVE) per construct; all values are within accepted values (CR .70; a .70; AVE .50), which demonstrates high levels of internal consistency and convergent validity. The values of CR are between.89 and.92, and the values of a of Cronbach are between.86 and.89, indicating high levels of scale reliability in line with modern-day measurement principles of organizational studies (Alwaely et al., 2024; Al-Matari et al., 2022). AVE scores (.58-.63) indicate that most of the indicator variance of each construct is represented by the latent construct and not the measurement error, which is particularly significant in such constructs of interest as customer satisfaction and technological advancement where perceptual measures are prevalent (Harahap et al., 2024; Chaudhuri et al., 2024). These psychometric results are consistent with the best practice guidelines on the use of validated measures in PLS-SEM research (Qing et al., 2023) and allow moving on to structural model testing with confidence that measurement error is reasonably managed.

Table 3: ***HTMT***

	TechAdv	BPE	CS	BG
Technological Advancements				
Business Process Efficiency	0.54			
Customer Satisfaction	0.60	0.49		
Business Growth	0.47	0.65	0.71	

Table 3 indicates that all construct pairs have HTMT ratios that are less than 0.85 (range .47-.71), which is a very strong indication of discriminant validity based on existing guidelines on PLS-SEM (Henseler et al.; as used in empirical management studies in recent times). Customer Satisfaction and Business Growth have the highest HTMT (.71), which is not surprising: customer-oriented outcomes are conceptually close to growth measures since satisfaction often leads to repurchase, retention, and growth in revenue (Machingura et al., 2024; Harahap et al., 2024). The values of the HTMT are, however, comfortably lower than the traditional cutoffs, which means that despite the relationship between the constructs, they are empirically different and are not manifestations of one latent factor. These discriminant outcomes are essential when mediation mechanisms are being tested in case discriminant validity was low, mediation estimates may be biased due to an overlap in measurement (Qing et al., 2023). The medium HTMT between Technological Advancements and Customer Satisfaction (.60) is conceptually consistent: high-tech technologies tend to enhance service delivery and individualization, which creates customer satisfaction at a higher level (Alwaely et al., 2024; Asawawibul et al., 2025). Equally, the Tech-BPE HTMT (.54) concurs with the opinion that technologies facilitate the improvement of the processes without suggesting identity.

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Table 4: ***Predictive Relevance And Effect Sizes, Explained Variance, And (Stone–Geisser)***

Endogenous / Path	R^2	Q^2	f^2 (approx.)
Business Process Efficiency (mediator)	0.48	0.30	
Customer Satisfaction (mediator)	0.45	0.27	
Business Growth (endogenous)	0.62	0.33	
Paths (selected)			
Tech → BPE			0.35 (large)
Tech → CS			0.28 (medium–large)
BPE → BG			0.22 (medium)
CS → BG			0.18 (small–medium)
Tech → BG (direct)			0.05 (small)

Table 4 shows substantive explained variance and predictive relevance of the endogenous constructs of the study: R2 = .48 of Business Process Efficiency, R2 =.45 of Customer Satisfaction and R2 =.62 of Business Growth, with positive values of Q2 (>.25) which indicate significant out-of-sample predictive relevance. These R2s suggest that technological progress and mediator variables account for a moderate to substantial amount of variance in the mediators and a significant amount of variance in Business Growth results in line with recent empirical research that has found technology and internal capabilities to be the key determinants of firm-level performance (Wang et al., 2023; Martinez-Pelaez et al., 2023). The f2 effect sizes indicate that there is a large effect of Technology on Business Process Efficiency (0.35), medium-large effect on Customer Satisfaction (0.28), and medium effects of the mediators on Business Growth (0.22 and 0.18). This direct Tech-BG effect is low (f2 = 0.05), which is empirically consistent with the theoretical assumption of RBV that resources (technology) have a significant part of their impact on enacting capabilities and may not only have a direct one (Al-Matari et al., 2022; Chaudhuri et al., 2024). The positive Q2 values (.27-.33) also support the practical predictive ability of the model, implying that the mentioned antecedent and mediator variables can be used to predict managerial outcomes in other similar manufacturing settings (Liu and Chen, 2024; Harahap et al, 2024).

Table 5: ***Structural Results: Path Coefficients***

Hypothesis / Effect	Path (β)	Coefficient	t-value	p-value	Conclusion
H1: Tech → BG (direct)	0.162		2.45	.014	Supported (partial)
Indirect Tech → BPE → BG	0.211		5.9	< .001	Significant mediation
Indirect Tech → CS → BG	0.160		4.7	< .001	Significant mediation

Table 5 shows the structural estimates and mediation tests that prove the hypothesized relationships. Technology is a strong predictor of Business Process Efficiency (b = .618, p < .001) and Customer Satisfaction (b =.537, p <.001), which is consistent with the literature on the subject, suggesting that digital investments lead to operational and relational benefits (Chaudhuri et al., 2024; Alwaely et al., 2024). The effects of both mediators are significant predictors of Business Growth (BPE - BG b =.341; CS - BG b =.298; p <.001), and

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the indirect effects (Tech-BPE-BG =.211; Tech-CS-BG =.160) are statistically significant evidence of mediation that is consistent with theory that resources lead to outcomes through capability enactment (Martinez-Pelaez et al., 2023; Liu and Chen, 2024). The direct effect of Tech-BG is positive but small (b = .162, p =.014), which means that technology can be partially directly related to the growth but the dominant part of its total effect (total b .533) is mediated by the process and customer channels. This trend is parallel to the focus of RBV on how resources are converted into performance in terms of organizational routines and capabilities (Al-Matari et al., 2022). The size and importance of mediated paths imply that managers must focus on integrating technology into the process improvements and customer-facing practices to achieve growth advantages (Wang et al., 2023; Harahap et al., 2024).

Discussion

The initial hypothesis was that technological innovations have a positive effect on the growth of business. These findings were highly indicative of this relationship meaning that companies, which capitalize on advanced digital tools, analytics, and automation of its processes, are more likely to achieve better growth results. This observation agrees with the recent research that proposed that digital transformation enhances the ability of firms to maximize operations, seize market opportunities, and increase strategic agility (Yu et al., 2022; Wang et al., 2023). It also echoes with the resource-based theory, which assumes that technology is a strategic resource that contributes to the long-term competitive advantages. Empirical research also revealed that the technology-based capabilities provoke the increase in performance through enhancing internal efficiencies and aiding strategic decision-making (Chaudhuri et al., 2024; Alwaely et al., 2024). The findings of the present study support these findings and highlight that organizations that will be able to incorporate the technological development in their main processes will be more likely to experience the growth that can be scaled and sustained.

The second hypothesis was that technological advancements and business growth are related through business process efficiency. This was also accepted, and showed that the advantages of technological adoption were not just the direct ones, but enhanced by the streamlined processes and the minimized redundancies and enhanced operational integration. The results are consistent with those of Liu and Chen (2024) who emphasize that business process management can improve environmental and operational performance with the help of information technologies. In line with the previous findings that technology assets enhance process agility and resilience (Al-Matari et al., 2022; Martinez-Pelaez et al., 2023), the mediation effect shows that technology generates value when converted into process-level gains. The results also reiterate the position that the role of technology in growth depends on the ability to use it internally and not simply on the employment of digital tools.

The third hypothesis tested the role of customer satisfaction in mediating the relationship between technological developments and business development. The findings helped to verify the suggested mediation, which states that technology-based enhancements in service quality, responsiveness, and customer experience make a crucial impact on business outcomes. This is in line with previous studies that have shown that technology improves the customer experience, service error, and personalization aspects that specifically lead to satisfaction and loyalty (Harahap et al., 2024; Gazi et al., 2024). The same experiments in the context of digital services have indicated that the adoption

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of technology increases the level of satisfaction in terms of better quality of the services and a decrease in transaction costs (Qing et al., 2023; Arshad Khan and Alhumoudi, 2022). The mediation relationship in this study supports the idea that customer-based results represent a key avenue by which technological capabilities help to drive firm-based performance. The results note the multidimensional channels that technological innovations contribute to business development, enhancing the internal and external customer experience.

Limitations and Future Research Directions

The findings have a number of limitations which must be considered when interpreting them. The cross-sectional research design does not allow drawing causal conclusions, since the relations were only identified at a certain point in time; longitudinal designs may also help to gain deeper understanding of the way in which the changes caused by technology occur over time. The use of self-reported information provided by employees could have resulted in some perceptional bias and this could be dealt with in future studies by using objective performance indicators, or multi-source data. Further, only medium and large manufacturing companies were sampled which limits the applicability of the results to other industries like services, logistics or technology intensive industries. The sectoral scope of the study should be extended in future to determine whether contextual distinctions influence impacts of technological developments.

The model has incorporated just two mediators in the form of business process efficiency and customer satisfaction of the mediators whereas other theoretically relevant mechanisms have the potential to further explain growth outcomes. The further research may include the consideration of other organizational constructs like innovation capability, dynamic capabilities, digital culture, or knowledge management practices that have been emphasized in the recent studies as the key drivers of performance (Chaudhuri et al., 2024; Martinez-Pelaez et al., 2023). A second potential avenue is the moderating variables that can be tested, including environment turbulence, regulatory support or readiness in an organization, which can reinforce or dilute the effect of technology. Moreover, cross-country comparative analyses might also be a useful source of information as they would investigate the role of institutional environments and national digitalization policies in these relations. Removing these shortcomings would spur more vigorous theory development and increase the level of knowledge on technology-based growth processes.

References

Al-Bashayreh, M., Almajali, D., Al-Okaily, M., Masa'deh, R. E., & Samed Al-Adwan, A. (2022). Evaluating electronic customer relationship management system success: the mediating role of customer satisfaction. Sustainability, 14(19), 12310.

Albloushi, B., Alharmoodi, A., Jabeen, F., Mehmood, K., & Farouk, S. (2023). Total quality management practices and corporate sustainable development in manufacturing companies: the mediating role of green innovation. Management Research Review, 46(1), 20-45.

Aljumah, A. I., Nuseir, M. T., & El Refae, G. A. (2022, November). Business analytics and competitive advantage for SMEs in UAE: A mediating role of technology assets. In 2022 International Arab Conference on Information Technology (ACIT) (pp. 1-9). IEEE.

Vol. 3 No. 11 (2025)

Journal of Social Signs Review

Online ISSN 3006-4651

Print ISSN 3006-466X

Al-Matari, A. S., Amiruddin, R., Aziz, K. A., & Al-Sharafi, M. A. (2022). The impact of dynamic accounting information system on organizational resilience: the mediating role of business processes capabilities. Sustainability, 14(9), 4967.

AlMulhim, A. F. (2021). Smart supply chain and firm performance: the role of digital technologies. Business Process Management Journal, 27(5), 1353-1372.

Alwaely, S. A., Abusalma, A., Alwreikat, A. A., Al-Shakri, K. S., Ahmad, A. Y. B., & Alkhawaldeh, B. Y. (2024). Examining the relationship between business intelligence adoption and marketing effectiveness: The mediating role of customer satisfaction. International Journal of Data and Network Science, 8(3), 1541-1556.

Arshad Khan, M., & Alhumoudi, H. A. (2022). Performance of E-banking and the mediating effect of customer satisfaction: a structural equation model approach. Sustainability, 14(12), 7224.

Asawawibul, S., Na-Nan, K., Pinkajay, K., Jaturat, N., Kittichotsatsawat, Y., & Hu, B. (2025). The influence of cost on customer satisfaction in e-commerce logistics: Mediating roles of service quality, technology usage, transportation time, and production condition. Journal of Open Innovation: Technology, Market, and Complexity, 11(1), 100482.

Chaudhuri, R., Chatterjee, S., Vrontis, D., & Thrassou, A. (2024). Adoption of robust business analytics for product innovation and organizational performance: the mediating role of organizational data-driven culture. Annals of Operations Research, 339(3), 1757-1791.

Feng, Y., Akram, R., Hieu, V. M., & Hoang Tien, N. (2022). The impact of corporate social responsibility on the sustainable financial performance of Italian firms: mediating role of firm reputation. Economic research-Ekonomska istraživanja, 35(1), 4740-4758.

Gazi, M. A. I., Al Mamun, A., Al Masud, A., Senathirajah, A. R. B. S., & Rahman, T. (2024). The relationship between CRM, knowledge management, organization commitment, customer profitability and customer loyalty in telecommunication industry: The mediating role of customer satisfaction and the moderating role of brand image. Journal of Open Innovation: Technology, Market, and Complexity, 10(1), 100227.

Harahap, A. T., Kadir, A. R., Nohong, M., Sobarsyah, M., & Sabbar, S. D. (2024). Impact of Service Digitalization on Operational Efficiency and Company Performance: Mediating Effect of Customer Satisfaction in Perumda Tirta Benteng. International Journal of Operations and Quantitative Management, 30(3), 36-60.

Khalil, M., Khawaja, K. F., & Sarfraz, M. (2022). The adoption of blockchain technology in the financial sector during the era of fourth industrial revolution: a moderated mediated model. Quality & Quantity, 56(4), 2435-2452.

Kurniawan, R., Budiastuti, D., Hamsal, M., & Kosasih, W. (2021). Networking capability and firm performance: the mediating role of market orientation and business process agility. Journal of Business & Industrial Marketing, 36(9), 1646-1664.

Liu, L., & Chen, L. (2024). Investigating business process management on environmental performance considering the mediating role of information technology. Heliyon, 10(23).

Vol. 3 No. 11 (2025)

Journal of Social Signs Review

Online ISSN 3006-4651

Print ISSN 3006-466X

Machingura, T., Muyavu, A. T., & Adetunji, O. (2024). The impact of soft lean practices on business performance: mediating role of customer satisfaction. International Journal of Quality and Service Sciences, 16(4), 433-456.

Martínez-Peláez, R., Ochoa-Brust, A., Rivera, S., Félix, V. G., Ostos, R., Brito, H., ... & Mena, L. J. (2023). Role of digital transformation for achieving sustainability: mediated role of stakeholders, key capabilities, and technology. Sustainability, 15(14), 11221.

Niyi Anifowose, O., Ghasemi, M., & Olaleye, B. R. (2022). Total quality management and small and medium-sized enterprises'(SMEs) performance: Mediating role of innovation speed. Sustainability, 14(14), 8719.

Qing, W., Amin, M. B., Gazi, M. A. I., Khan, W., Al Masud, A., & Alam, M. N. (2023). Mediation effect of technology adaptation capabilities between the relationship of service quality attributes and customer satisfaction: an investigation on young customers perceptions toward e-commerce in China. Ieee Access, 11, 123904-123923.

Rambe, P., & Khaola, P. (2022). The impact of innovation on agribusiness competitiveness: the mediating role of technology transfer and productivity. European Journal of Innovation Management, 25(3), 741-773.

Riyanto, S., Endri, E., & Herlisha, N. (2021). Effect of work motivation and job satisfaction on employee performance: Mediating role of employee engagement. Problems and Perspectives in Management, 19(3), 162.

Wang, Z., Lin, S., Chen, Y., Lyulyov, O., & Pimonenko, T. (2023). Digitalization effect on business performance: role of business model innovation. Sustainability, 15(11), 9020.

Yan, C., Siddik, A. B., Yong, L., Dong, Q., Zheng, G. W., & Rahman, M. N. (2022). A two-staged SEM-artificial neural network approach to analyze the impact of FinTech adoption on the sustainability performance of banking firms: the mediating effect of green finance and innovation. Systems, 10(5), 148.

Yu, J., Wang, J., & Moon, T. (2022). Influence of digital transformation capability on operational performance. Sustainability, 14(13), 7909.