

Effect of Technological and Product Innovation Practices on SMEs Performance with the Mediating Role of Government Support Programs in Addis Ababa, Ethiopia, Analyzed Through BSC Framework

By:

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Abstract

This study examines the effect of technological and product innovation on the performance of Ethiopian SMEs, with a focus on the mediating role of government Support Programs. 431 SME owner/managers in Addis Ababa participated in a quantitative, cross-sectional survey design that used standardized, closed-ended questionnaires, multi-stage sampling, and systematic random sampling to gather primary data. For descriptive and inferential statistics, data analysis was conducted using SPSS Version 26. Structural equation modeling (SEM) was enabled by AMOS software Version 26 to investigate the suggested associations. The results indicate that corporate performance is significantly improved by both technological and product enhancements ($\beta = 0.395, p < 0.001$, and $\beta = 0.428, p < 0.001$, respectively), with government support serving as a stimulant that partially mediates these interactions. This research combines viewpoints from the Resource-Based View, Innovation Diffusion Theory, Stakeholder Theory, and the Balanced Scorecard to offer a thorough comprehension of performance and innovation in a developing economy. To better understand the contextual factors influencing innovation, future research should focus on qualitative insights, industry-specific nuances, and longitudinal effects. This will provide policymakers and SME managers with useful guidance on how to promote sustainable growth through targeted support systems..

Keywords: *Technological Innovation, Product Innovation, Government Support Programs, Firm Performance, SMEs, and BSC*

1. Introduction

The expansion of small and medium-sized businesses (SMEs), both locally and internationally, depends on innovation (Kassa & Kegne, 2025). According to Lin, (2024) Innovative SMEs are crucial contributors to national economies by introducing new products and technology that boost productivity, create jobs,

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and propel economic progress. Additionally, they have a favorable influence on community development and economic resilience, making them important for sustainable development. Innovation improved the competitiveness and operational efficiency of small and medium-sized businesses (SMEs), which greatly aided in their success. SMEs were able to better satisfy market demands by implementing new technologies and enhancing their product offerings, which resulted in higher levels of consumer satisfaction and loyalty (Ketema, 2024). This dynamic promoted economic growth in their communities and made it easier to create jobs.

As emphasized by Schumpeter's theory, SMEs have come to understand the critical role that innovation plays in propelling their growth (Lin, 2024). They started putting strategic innovation methods into practice that fit their local situations, especially in developing nations like Ethiopia (Engidaw et al., 2024). This change in emphasis highlighted how crucial it is to comprehend how outside variables, like how successful these innovation initiatives are government assistance may affect.

Many SMEs faced major obstacles that hindered their ability to innovate, despite the potential advantages. Frequently, their efforts were hindered by a lack of resources, access to cutting-edge technologies, and insufficient managerial abilities (Gebrerufael et al., 2025). Furthermore, the unique requirements of SMEs were often overlooked by government assistance programs, highlighting the pressing need for customized regulations that may better encourage innovation and improve business performance in the industry.

2. Background of Study

Economic development was significantly influenced by the state of small and medium-sized businesses (SMEs), particularly in emerging nations like Ethiopia (Abate & Sheferaw, 2023). About 73% of the urban workforce was employed by these businesses, which contributed about 36% of the national GDP and acted as catalysts for innovation, adaptability, and job creation (Belisti et al., 2025). Nevertheless, many SMEs faced major obstacles that hindered their capacity to innovate successfully, notwithstanding their potential.

Due to limited access to financing, poor infrastructure, and a shortage of skilled labor, Ethiopian SMEs found it difficult to adopt technological and product innovations (Ketema, 2024). A case study of the textile industry showed that, despite the demand for creative clothing designs, many companies lacked the funds to invest in modern machinery or employee training, which hindered their ability to compete in both domestic and foreign markets.

Additionally, the government support programs' bureaucratic structure made it more difficult for SMEs to innovate (Su et al., 2024). According to an agro-processing industry research, government-sponsored programs that were meant to supply funds and resources frequently had drawn-out application procedures and strict eligibility requirements. This limited the possible advantages of government assistance by making some entrepreneurs feel irritated and hesitant to participate in these initiatives.

Ethiopian innovation is greatly impacted by cultural variables; many entrepreneurs have a risk-averse mindset that discourages investment in new technology (Gebrerufael et al., 2025). A software company's case study demonstrated the difficulties in persuading regional farmers to embrace cutting-edge farming technologies, underscoring the pressing need for programs designed to address the unique needs of Ethiopian SMEs (Dawit Udessa Gede, 2024).

3. Statement of the Problem

The rapidly changing global economy highlights the critical role of innovation for small and medium-sized enterprises (SMEs) (Hu et al., 2024). In Ethiopia, however, the reality falls short of the ideal, where business success relies on technological and product innovation (Ledi, 2024). Challenges such as inadequate government support, poor infrastructure, and limited resource access hinder SMEs from implementing effective innovation strategies (Boru et al., 2025). This gap illustrates a significant disconnect between the aspirational and actual performance of SMEs, emphasizing the need for a deeper understanding of how to maximize innovation approaches in this context (Ndlovu et al., 2025).

There is conflicting evidence about how government support affects the results of innovation (Balzano et al., 2025). Although some research points to a beneficial association, other studies imply that such support may not have a significant impact on company success in developing countries like Ethiopia (Yimam et al., 2025). Along with unresolved issues regarding successful innovation strategies for different industries within the Ethiopian SME landscape and the external factors at play, this inconsistency highlights a theoretical gap in understanding how government assistance influences performance and innovation.

The particular difficulties faced by Ethiopian SMEs, such as cultural obstacles, market limitations, and economic volatility, are frequently ignored by current studies (Yimam et al., 2025). Furthermore, the innovation landscape is complicated by government rules that are not aligned (Balzano et al., 2025). By using the Balanced Scorecard framework to evaluate the effects of government support and product and technology innovation strategies, this study seeks to close these gaps and offer practical recommendations for improving performance and innovation in Ethiopian SMEs.

4. Specific Objective of the study

1. To investigate the effect of technological and product innovation on the firm performance of SMEs
2. To study the mediating effect of Government Support programs on the relationships between technological and product innovation and the firm performance of SMEs.

5. Theoretical Framework

In exploring the relationship between technological and product innovation practices, government support programs, and firm performance in Ethiopian SMEs, several theoretical perspectives can be applied.

Resource-Based View (RBV): According to the Resource-Based View (RBV), a company's competitive edge is mostly determined by its distinct assets and competencies, including organizational culture, technological know-how, and skilled workers (Mardatillah et al., 2024). Innovation and enhanced performance for Ethiopian SMEs depend on generating unique characteristics and efficiently utilizing internal resources (Yimam et al., 2025). Furthermore, outside assistance, such as government initiatives, can strengthen the capacities and resource bases of these companies.

Innovation Diffusion Theory (IDT) looks at how new technologies and ideas spread, particularly among SMEs. It highlights how external factors, like government support, can help SMEs adopt innovative practices (Díaz-Arancibia et al., 2024). Policymakers can develop more successful programs to encourage innovation among Ethiopian SMEs by determining the elements that affect adoption rates,

such as perceived benefits, compatibility, and complexity (Abate & Sheferaw, 2023). IDT provides a framework for examining obstacles to the adoption of innovations and the possible outcomes of government assistance in promoting this process.

Stakeholder theory emphasizes how crucial it is to identify and meet the demands of different stakeholders, especially for Ethiopian SMEs, such as clients, suppliers, governmental agencies, and the local community (Y. A. Mamo et al., 2023). This strategy is essential for coordinating government aid initiatives with the interests of SMEs and other stakeholders. Company performance and creativity can be improved by taking into account the varied expectations and contributions of different groups.

The Balanced Scorecard (BSC) framework incorporates both financial and non-financial metrics from four perspectives: internal processes, learning and growth, customers, and finances. In this study, the BSC is used to assess how government support and product and technological innovations affect the overall performance of Ethiopian SMEs (Tamirat, 2024). By methodically examining the relationships between innovation tactics and performance results, the study provides a comprehensive understanding of the intricacies present in the SME environment.

Definitions and Origins of Key Terms

The significance of technological innovation for economic advancement by defined it as the introduction of new or enhanced goods, services, or processes employing sophisticated technology (Byaro & Rwezaula, 2024). The idea of "creative destruction" as proposed by Joseph Schumpeter, describes how new technologies both generate opportunities and upend economies (Lin, 2024).

Product innovation is defined by the OECD's Oslo Manual as "the process of developing and launching new or improved products or services that provide added value to customers, with an emphasis on improvements in design, functionality, or usability(Santos, 2024)." With its roots in marketing, product innovation places a strong emphasis on comprehending the needs and preferences of consumers and evolves in tandem with technological advancements and changes in consumer behavior(Amajuoyi et al., 2024). Product innovation is essential for businesses looking to gain a competitive edge.

Firm performance, usually measured by metrics like profitability, market share, revenue growth, and customer satisfaction, assesses how well a business operates and accomplishes its goals(Alyahya, 2025). Beginning with a focus on financial measures in management theory, the idea has expanded to encompass non-financial aspects, giving rise to frameworks such as the Balanced Scorecard (Kumar et al., 2024). The realization that financial results, employee and customer satisfaction, and efficient internal procedures are all necessary for long-term success is reflected in this change.

Government support programs are aimed at helping businesses, particularly small and medium-sized enterprises, with things like funding, training, and technology development (Inmor et al., 2025). In the years following World War II, while nations were trying to reconstruct their economy, these initiatives were created with the goals of boosting economic development, encouraging innovation, and improving competitiveness. In developing nations like Ethiopia, this kind of assistance is essential for encouraging entrepreneurship and resolving market imperfections that hinder the expansion of SMEs (Endris & Kassegn, 2022).

In the early 1990s, Robert Kaplan and David Norton created the Balanced Scorecard (BSC), a framework

for performance management and strategic planning that strikes a balance between non-financial and financial aspects (Tamirat, 2024). It converts strategic objectives into quantifiable goals from four angles: internal operations, customers, learning and development, and finances. The BSC is now widely used in many industries to align operations with strategic goals, as it was realized that standard financial indicators were insufficient for evaluating long-term success.

5.1 Empirical literature and hypothesis development

Developing testable hypotheses regarding variable relationships requires the use of empirical literature. To guide the creation of accurate, testable hypotheses, researchers examine earlier research to find knowledge gaps or discrepancies (Alfuth et al., 2025). They guarantee relevance and significant contributions to the subject by firmly establishing their hypothesis in the body of previous research (Chang et al., 2024).

Technological Innovation and Firm Performance

Research suggests a positive correlation between firm performance and technical innovation. According to Ledi (2024) Innovative businesses improve their competitive edge and financial success by better adapting to market changes. According to Böhmann et al (2025) Research and development expenditures are associated with higher productivity, market share, and profitability. In general, corporate success and stable market expansion in competitive contexts are greatly aided by technical innovation.

According to an empirical study, there is a non-linear or negative correlation between corporate performance and technical innovation (Horvey & Odei-Mensah, 2025). According to Min et al. (2024) if new technologies are not used effectively, excessive investment in them may result in declining returns. Technological advancements could become outdated due to rapid changes, necessitating ongoing investment while underutilizing current technologies (Barreto et al., 2025). Financial strain and distraction from core tasks may result from this, which could affect overall performance and show that the advantages of technological innovation are context-specific and not always present.

H1: Technological innovation has a statistically significant relationship with firm performance.

Product Innovation and Firm Performance

Product innovation and business performance are strongly positively correlated, according to empirical studies (Han et al., 2024). In contrast to their less innovative peers, companies that actively participate in product innovation typically obtain higher sales growth and market share, according to a study by (Marty et al., 2024). Research further supports this association by showing that businesses that launch new goods are more likely to increase consumer happiness and loyalty, which in turn boosts profitability (Ghaderi et al., 2024). Additionally, unique items can set businesses apart from the competition, enabling them to charge higher rates and strengthen their position in the market.

Product innovation is often linked to improved business performance, but empirical research shows that this relationship is not always positive (Cabaleiro & Pedro, 2024). Companies may prioritize creating new items above improving their current offerings, which would reduce customer satisfaction and loyalty. If market research isn't done well, innovation might result in mismatched products, low sales, and financial losses. Rapid changes can confuse consumers and erode brand trust, and if innovations don't live up to expectations, the costs of product development might strain finances (Saptono et al., 2024).

Therefore, product innovation can enhance performance, but it can also have unfavorable effects in certain circumstances.

H2: Technological innovation has a statistically significant relationship with firm performance.

Product Innovation and Government Support

Research indicates that government assistance and product innovation are positively correlated, with public policies such as tax incentives and subsidies boosting a company's capacity for innovation (Han et al., 2024). Government-backed R&D promotes cooperation between public and private institutions, as Li & Xu (2025) showed, whereas found that government funding lowers financial risks and encourages private sector innovation. In addition to facilitating the development of new products, this encouraging atmosphere increases overall firm performance and competitiveness, highlighting the critical role that government plays in promoting economic growth and innovation.

There may be a negative correlation between government support and product innovation, according to an empirical study. Businesses that depend too much on government assistance, according to Wilhelm & Wilhelm (2024), may put bureaucratic compliance ahead of autonomous innovation. Moreover, Fan & Fan (2025) point out that subsidies have the potential to stifle competition by favoring less innovative businesses over more experienced ones. Government support may therefore unintentionally stifle entrepreneurial spirit and impede the development of ground-breaking products, even though it is meant to promote innovation.

H3: Product innovation has a statistically significant relationship with Government Support.

Technological Innovation and Government Support

Research shows that government assistance for technological innovation is positively correlated with a firm's ability to innovate. Audretsch & Fiedler (2023) discovered, for instance, that government funds ease financial constraints, allowing for ambitious research and development programs. According to Böhmman et al (2025) This kind of assistance encourages cooperation between industry and academia, which speeds up technical breakthroughs and facilitates knowledge transfer.

Research indicates that government funding can negatively affect technical innovation under certain conditions. Teece (2025) points out that such support may foster complacency, leading businesses to depend more on public resources than their own creativity. Additionally, bureaucratic procedures associated with government assistance can hinder agility and create delays, diverting focus from innovation objectives (Jayamuna I Made, 2024). While intended to promote technical advancements, government funding can sometimes produce counterproductive effects that undermine innovation outcomes.

H4: Technological innovation has a statistically significant relationship with Government Support.

Government Support and Firm Performance

Empirical research has demonstrated a favorable correlation between corporate performance and government support, highlighting the government's role in enhancing company outcomes. According to a study by Fernandez-Pinto et al (2024), Government-funded programs increase enterprises' capacity for

research, which increases innovation and production. Furthermore, found that companies that receive government assistance perform better financially and expand more quickly. Since it not only supplies the resources required but also fosters strategic partnerships and information exchange, effective government support is essential for enhancing corporate performance and advancing economic development.

Empirical research shows that government assistance can sometimes hinder business success. Zhang et al. (2024) argue that excessive reliance on subsidies may reduce productivity by stifling efficiency and innovation. Additionally, Wandosell & Bobadilla (2023) note that such support can create market distortions, allowing less capable firms to thrive at the expense of more competent competitors. This reliance may also lead to complacency, with businesses prioritizing short-term gains over long-term strategic investments, ultimately undermining growth and competition.

H5: Government Support has a statistically significant relationship with Firm Performance

Government Support mediates the relationship between Technological Innovation and firm performance

The relationship between technological innovation and firm performance may be mediated by government support programs, but this mediation may be both beneficial and detrimental. On the one hand, research like that done by Alvarez-Salazar et al. (2025) indicates that government programs can offer the necessary funds and resources to allow businesses to invest in cutting-edge technologies, which improves performance. By reducing the financial risks connected with innovation, these initiatives can motivate businesses to explore new technologies that they might otherwise pass up because of cost considerations.

Government support can encourage complacency and dependence, which can cause firms to abandon their own creative thinking (Al-Faryan, 2024). This can have a detrimental effect on overall performance (Su et al., 2024). The flexibility necessary for effective innovation can sometimes be hampered by bureaucratic limitations from government initiatives. Such support may involve risks that compromise the potential benefits of innovation, even while it can have a positive impact on the relationship between technological innovation and business success.

H6: Government Support mediates the relationship between Technological innovation and firm performance.

Government Support programs mediate the relationship between Product Innovation and firm performance

Programs for government assistance have the power to greatly mediate the link between business performance and product innovation, impacting results in several ways (Jin & Lee, 2020). Government programs like grants and tax incentives can give businesses the money they need to invest in new product development (De Rose & Malavenda, 2024). Businesses can create new items, improve their current services, and eventually boost their market performance with this financial support. While Government support can promote the development of new products and improve performance, it can also have negative consequences. Too much dependence on such assistance can cause companies to put financial needs ahead of actual market demands, which can lead to poor inventions that don't appeal to customers (George, 2024). Furthermore, government funding of bureaucratic processes can inhibit innovation and creativity, creating barriers that reduce the efficacy of innovation projects.

H7: Government Support mediates the relationship between Product innovation and firm performance.

5.2 Conceptual Framework

The conceptual framework directs the study's course by outlining important concepts, variables, and their connections. According to Kassa & Kegne(2025) Analysis of the impact of government support on Ethiopian SMEs, technological innovation boosts performance through research and development, while new product innovation boosts market share and customer satisfaction (Chang et al., 2024). Government support offers tools to encourage innovation and help decision-makers enhance the performance of SMEs.

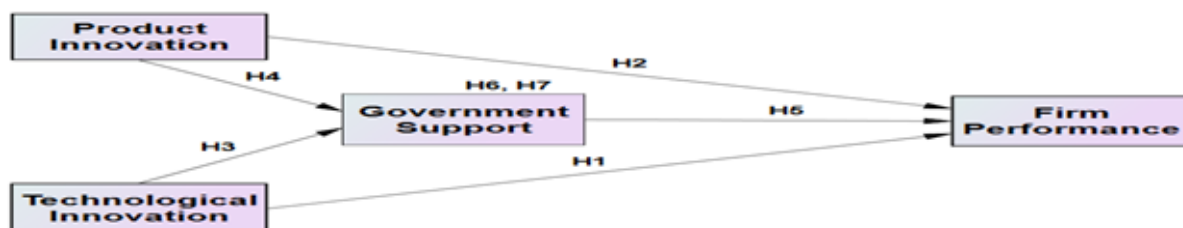


Figure. 1 Conceptual Framework of the study

(Source: Developed by researchers using AMOS Software, 2024)

6. Methodology

6.1 Research Design and Approaches

This study uses a cross-sectional survey design and quantitative methodologies to investigate the relations between government support programs, firm performance, and technological and product innovation practices among small and medium-sized firms (SMEs) in Addis Ababa, Ethiopia. The research attempts to offer precise and quantitative insights into how these aspects interact and influence one another by concentrating on numerical data analysis and statistical testing of ideas. A greater comprehension of the dynamics at work in the SME landscape is made possible by the focus on quantitative analysis, which also improves the findings' dependability. In the end, this strategy aims to provide useful information that can guide strategic practices and policy choices, creating a more innovative and competitive environment for SMEs in the study area.

6.2 Target Population, Sampling Technique, and Sample Size

The study sample is drawn from the entire group of 4,130 small and medium-sized businesses (SMEs) that are registered with the Addis Ababa City Government, which is the target population. To assure representativeness and account for expected low response rates, a multi-stage cluster sampling approach and systematic random techniques was used to choose a sample of 431 SMEs, which was determined using Yamane's formula. And validated scales for measuring the main constructs were included in a structured questionnaire used to gather data.

In order to maximize the generalizability of the results and offset the anticipated low response rate of 15 to 20 percent, a large sample size was chosen for this study (Amentie Kero & Sogbossi, 2019; Walusinski, 2018). Yamane's (1967) formula for determining sample size is used to get the representative sample size, which is as follows: where n is the desired sample size, N is the population, and e is the sampling

error margin at 5% (recommended value of 0.05) at a 95% confidence level. The following formula was used to calculate the sample size:

The formula is: $n = N / (1 + N(e^2))$ ----- Equation (1) ---(Yamane's (1967) formula)

$n = 4130 / (1 + 4130(0.05^2))$, $n = 4130 / 11 = 375 \dots n = 375$, $375 + 15\% \text{ of } 375 = 431$

Therefore, the sample size is $n = 431$

6.3 Methods of data analysis

After the KMO measure showed sufficient sample adequacy, the exploratory factor analysis (EFA) verified factors in line with the theoretical framework. Gaspar Pacheco et al. (2024) adapted items for technological and product innovation, Partouvi & Najafi (2024) adapted business performance from the Balanced Scorecard framework, and Fainshtein et al. (2024) adapted items for government support. Using AMOS, structural equation modeling (SEM) examined the connections between the constructs and demonstrated how government support programs mediate the impact of innovation on SMEs' performance. A strong fit was shown by the model, demonstrating how well it represented the data.

7. Data analysis and interpretation

7.1 Descriptive Statistics

The study surveyed 431 small and medium-sized businesses, with a roughly equal mix of 49.9% small businesses (215 firms) and 50.1% medium-sized organizations (216 firms). 76.3% of owners were women, while 23.7% of owners were men, according to gender data. Owners were mostly between the ages of 41 and 50 (36.7%) or 31 and 40 (46.6%), and 48.7% had college degrees and 31.1% had finished secondary school. Additionally, 81.9% of enterprises had 11–20 years of experience, and 50.1% of firms employed more than 30 people, indicating a concentration of high capital in the sample.

7.2 Techniques for conducting data analysis

The study's data analysis comprised 431 SMEs and used the KMO measure to evaluate sample adequacy after descriptive statistics were used to summarize demographics. Congruent with the theoretical framework, exploratory factor analysis (EFA) validated item loading on constructs. Confirmatory Factor Analysis (CFA) verified the constructs, and AMOS-based Structural Equation Modeling (SEM) examined the connections between government support, company performance, and product and technical innovation. With good model fit indices and notable direct and mediated effects, the SEM results supported the goals of the study and offered insightful information about variable dynamics.

Table 1. KMO and Bartlett's Test

| | | |
|--|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | 0.824 | |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 6726.08 |
| | df | 136 |
| | Sig. | 0 |

Source: SPSS output, 2024

When assessing whether data is suitable for factor analysis, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity are crucial tools. The data may be suitable for identifying underlying factor structures, as indicated by the high level of sampling adequacy indicated by the KMO value of 0.824. A substantial difference from an identity matrix is also demonstrated by Bartlett's Test, which has a Chi-Square value of 6726.08, 136 degrees of freedom, and a significance level of 0. These findings support the propriety of moving further with component analysis in order to reveal latent connections and validate the relationships between variables.

Table 2: Total Variance Explained

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 6.160 | 38.499 | 38.499 | 6.160 | 38.499 | 38.499 | 3.571 | 22.317 | 22.317 |
| 2 | 2.958 | 18.490 | 56.989 | 2.958 | 18.490 | 56.989 | 3.417 | 21.356 | 43.673 |
| 3 | 1.917 | 11.984 | 68.973 | 1.917 | 11.984 | 68.973 | 2.773 | 17.334 | 61.007 |
| 4 | 1.346 | 8.410 | 77.382 | 1.346 | 8.410 | 77.382 | 2.620 | 16.375 | 77.382 |
| 5 | 0.693 | 4.329 | 81.711 | | | | | | |
| 6 | 0.573 | 3.580 | 85.291 | | | | | | |
| 7 | 0.384 | 2.401 | 87.692 | | | | | | |

Extraction Method: Principal Component Analysis.

Source: SPSS output, 2024

Table 2 shows the extraction sums of squared loadings, rotation sums of squared loadings, and initial eigenvalues from a Principal Component Analysis (PCA). The total variation is 68.9%, with the first component contributing 38.5% and the second and third contributing the remaining 18.5% and 12.0%, respectively. Rotation modifies the loadings with the first component accounting for 22.3% and the second for 21.4%, resulting in a cumulative variance of 43.7%. Following extraction, the first two components maintain the same variance percentages. Each of the components five through seven has an eigenvalue smaller than 1, indicating that they have little effect on the overall variance.

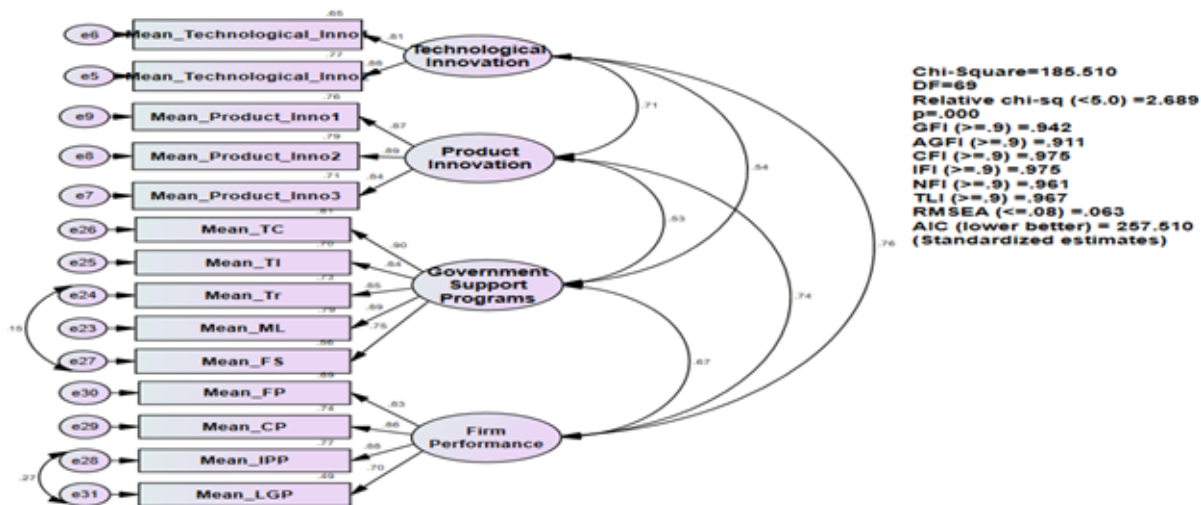


Figure 2 Confirmatory factor analysis (CFA) Source: AMOS output, 2024

Note: TI: Tax Incentive, Tr: Training, ML: Marketing Linkage, FS: Financial Support, FP: Financial Perspective, CP: Customer Perspective, IPP: Internal Process Perspective, LGP: Learning Growth Perspective

Confirmatory Factor Analysis (CFA) validated the relationships between observable variables and their latent constructs, hence confirming the factor structure proposed in the theoretical framework. As shown in Figure 2, the study examined correlations between observed variables. The findings in Table 3 assessed the measurement model's fit, ensuring that it was consistent with theoretical concepts and demonstrating the validity and reliability of the constructs.

Table 3: Covariances

| Covariances | | Estimate | S.E. | C.R. | P |
|-----------------------------|----------------------------------|----------|-------|--------|-----|
| Technological Innovation | <--> Product Innovation | 0.297 | 0.029 | 10.331 | *** |
| Technological Innovation | <--> Government Support Programs | 0.308 | 0.036 | 8.567 | *** |
| Technological Innovation | <--> Firm Performance | 0.417 | 0.039 | 10.658 | *** |
| Product Innovation | <--> Government Support Programs | 0.250 | 0.029 | 8.664 | *** |
| Product Innovation | <--> Firm Performance | 0.337 | 0.031 | 10.724 | *** |
| Government Support Programs | <--> Firm Performance | 0.411 | 0.041 | 9.986 | *** |

Source: AMOS output, 2024

Table 3 shows that corporate performance in SMEs is significantly correlated with elements like government support, technological innovation, and marketing innovation. Interestingly, there is a positive correlation between marketing innovation and government support programs (0.308, C.R. = 8.567), corporate performance (0.417, C.R. = 10.658), and product innovation (0.297, C.R. = 10.331, $p < 0.001$). Strong relationships between government assistance and company performance are also seen (0.411, C.R. = 9.986), suggesting that successful government initiatives improve marketing and technology, which in turn improve SME performance.

Table 4: Validity Concern

| Constructs | CR | AVE | MSV | MaxR(H) | \sqrt{AVE} | GSP | TI | PI | FP |
|------------|-------|-------|-------|---------|--------------|-------|-------|-------|-------|
| GSP | 0.927 | 0.718 | 0.445 | 0.935 | 0.847 | 0.847 | | | |
| TI | 0.831 | 0.711 | 0.570 | 0.840 | 0.843 | 0.542 | 0.843 | | |
| PI | 0.901 | 0.753 | 0.549 | 0.904 | 0.868 | 0.533 | 0.706 | 0.868 | |
| FP | 0.891 | 0.673 | 0.570 | 0.904 | 0.821 | 0.667 | 0.755 | 0.741 | 0.821 |

Note: TPIP= Technological innovation, product innovation; GSP= government support programs; FP= firm performance

Source: Using Results from Amos software & final output using Stats Tools Package (2025)

For every construct, reliability and validity metrics are shown in Table 4, with high Composite Reliability (CR) values: FP = 0.891, GSP = 0.927, TI = 0.831, and PI = 0.901. The values of Average Variance Extracted (AVE) (GSP = 0.718, TI = 0.711, PI = 0.753, FP = 0.673) show high convergent validity. In particular, for GSP (MaxR(H) = 0.935), Maximum Shared Variance (MSV) and Maximum Reliability (MaxR(H)) verify robust measurement properties. FP = 0.821, TI = 0.843, PI = 0.868, and GSP = 0.847 are examples of square root of AVE (\sqrt{AVE}) values that surpass correlation coefficients, indicating discriminant validity. These indicators collectively show that the constructs are trustworthy and well-defined for additional research.

7.3 Structural Equation Model and Hypothesis Testing



Figure 3: Structural equation model including the mediator

This study examined how corporate performance and technology, and product innovation strategies relate to one another, emphasizing the mediating function of government assistance initiatives. Results from structural equation modeling show that government support improves performance outcomes by increasing the efficacy of innovative tactics. Businesses that get government assistance are in a better position to use their innovation potential, highlighting the significance of successful government programs in enhancing SMEs' competitive edge.

7.4 Variable Measurement

Table 5: Tools for Variable Measurement

| Measure | Threshold |
|-------------------------|---|
| Chi-square/df (cmin/df) | <3 good;<5 sometime permissible |
| P-value for the model | > 0.05 |
| CFI | > 0.95 great; > 90 traditional; 0.80 sometime permissible |
| GFI | > 0.95 |
| AGFI | >0.80 |
| SRMR | <0.09 |
| RMSEA | <0.05 good; 0.05-0.10 moderate and >0.10 bad |
| IFI | >0.90 |
| NFI | >0.90 |
| TLI | >0.90 |

Source: Surachman et al (2024); Wang et al (2025).

In Table 5, important metrics and criteria for evaluating statistical model fit are listed, such as the Comparative Fit Index (CFI >0.95), Chi-square/df ratio (<3), and P-value (>0.05). Standardized Root

Mean Square Residual (SRMR <0.09), goodness-of-fit index (GFI >0.95), adjusted goodness-of-fit index (AGFI >0.80), and root mean square error of approximation (RMSEA <0.05) are other significant metrics. Researchers can assess the robustness and validity of the model by looking at the Normed Fit Index (NFI), Tucker-Lewis Index (TLI), and Incremental Fit Index (IFI), which should all be more than 0.90 (Surachman et al., 2024; Wang et al., 2025).

Table 6: Indices for Model Fit

| Sig. | Chi-Sq | RMR | Fitness Goodness | Fitness Confirmatory | TLI | RMSEA |
|-------|--------|-------|------------------|----------------------|-------|-------|
| 0.004 | 2.689 | 0.036 | 0.942 | 0.975 | 0.967 | 0.063 |

Source: AMOS result, 2024

Model fit indices and other statistical indicators of model quality are shown in Table 6. While the Chi-Square statistic is 2.689, backed by a Root Mean Square Residual (RMR) of 0.036, indicating a good model fit, the significance value (Sig.) is 0.004, indicating statistical significance. Strong performance is shown by the Fitness Confirmatory value of 0.975 and the Fitness Goodness value of 0.942. Adequate fit to the data is confirmed by the Root Mean Square Error of Approximation (RMSEA), which is 0.063, below the recognized level. Furthermore, the model is further validated using the Tucker-Lewis Index (TLI), which has a score of 0.967.

Table 7: Path Coefficient (Direct effect) Results

| Hypotheses | | B | Beta | SE. | CR. | P | Decisions |
|-----------------------------|---------------------------------|-------|-------|-------|-------|-----|-----------|
| Government_Support_Programs | <-- Technological_Innovation | 0.369 | 0.331 | 0.083 | 4.415 | *** | Accepted |
| Government_Support_Programs | <-- Product_Innovation | 0.405 | 0.300 | 0.097 | 4.172 | *** | Accepted |
| Firm_Performance | <-- Technological_Innovation | 0.395 | 0.365 | 0.066 | 5.936 | *** | Accepted |
| Firm_Performance | <-- Product_Innovation | 0.428 | 0.326 | 0.075 | 5.745 | *** | Accepted |
| Firm_Performance | <-- Government_Support_Programs | 0.287 | 0.296 | 0.043 | 6.713 | *** | Accepted |

Source: AMOS result, 2024

According to the route coefficient results, there are notable direct effects across the suggested linkages, and government support programs are essential for advancing technological innovation ($B = 0.369$, $p < 0.001$) as well as products ($B = 0.405$, $p < 0.001$). Firm performance is greatly improved by both forms of innovation ($B = 0.428$, $p < 0.001$ and $B = 0.395$, $p < 0.001$), and performance is also highly impacted by government support ($B = 0.287$, $p < 0.001$). These results confirm that government support combined with innovation can improve company performance.

Table 8. Mediating Role Effect

| Pathway | Type | Coefficient | Interpretation |
|-----------------|----------|---------------------------|-----------------------------|
| TI → FP | Direct | 0.36 | Direct influence |
| TI → GS → FP | Indirect | $0.33 \times 0.30 = 0.10$ | Government support mediates |
| TI Total Effect | Total | 0.46 | Partial mediation |
| PI → FP | Direct | 0.33 | Direct influence |
| PI → GS → FP | Indirect | $0.30 \times 0.30 = 0.10$ | Government support mediates |
| PI Total Effect | Total | 0.43 | Partial mediation |

Source: AMOS Software output 2024

Table 8 shows that government support acts as a partial mediating factor in the relation between innovation and firm performance. Our justification that the overall effect is more important than the direct effect. As we can see, government support has an indirect impact of 0.10 and technological innovation has a direct impact of 0.36, for a total effect of 0.46. With a direct impact of 0.33 and an indirect impact of 0.10, product innovation has a total effect of 0.43. These findings demonstrate the vital role that government assistance plays in boosting the effectiveness of innovations and offer useful information to firms trying to improve performance through innovation.

8. Discussion

The results of this investigation offer strong empirical backing for the initial theoretical frameworks. The findings support the notion that Addis Ababa, Ethiopian SMEs' firm performance is positively impacted by both technology (H1) and product (H2) innovation in a strong, statistically significant way (Böhmman et al., 2025; Marty et al., 2024). This is consistent with the Resource-Based View (RBV), which holds that innovation and other internal skills are key sources of competitive advantage (Mardatillah et al., 2024). SMEs are better positioned to fulfill market demands, increase operational efficiency, and eventually improve their financial and non-financial performance as determined by the Balanced Scorecard (BSC) when they invest in new technology and create new or improved products (Tamirat, 2024).

Importantly, the study also demonstrates that government assistance programs play a major mediating function (H6, H7)(Alvarez-Salazar et al., 2025). The data shows that although innovation has a powerful direct impact, government support greatly increases its influence. The "conflicting data" referenced in the problem description is resolved in part by this discovery. It implies that government assistance does not operate in a vacuum, but rather serves as a vital facilitator, offering the resources (financial assistance, training, and tax breaks) required for SMEs to successfully convert their creative potential into observable performance results. This partial mediation suggests that for the best results, both direct innovation initiatives and government-sponsored innovation are necessary.

This integrated model is further supported by the strong and positive correlations between government support and firm performance (H5) and between innovation and government support (H3, H4) (Chen et al., 2023). It refutes the claim that, in the Ethiopian setting of this sample, such support breeds complacency by showing that successful government initiatives are not only well-received by SMEs but are also used in ways that directly contribute to success.

9. Conclusion

This study unequivocally shows that innovation techniques, especially in technology and product creation, have a significant impact on Ethiopian SMEs' success. The process of turning invention into performance, however, is neither straightforward nor assured by internal initiatives alone. Effective government assistance programs are the main distinction.

The study effectively fills the gaps in theory and practice that have been found. It offers a multifaceted, verified model based on the BSC framework, demonstrating the critical catalytic role of government support. It lessens the limitations of scarce resources, inadequate infrastructure, and incompetent management that frequently impede Ethiopian SMEs. In order to improve economic resilience, job creation, and sustainable development in Ethiopia, it is crucial to create a symbiotic environment where unique government programs actively promote SME innovation.

Managerial Implications

As vital expenditures for expansion, SME owners must give technology adoption and product development top priority and allocate funds effectively. By aggressively seeking government support programs, innovation risks can be reduced and success rates raised. Like the Balanced Scorecard framework, managers should take a holistic approach to performance, taking into account internal procedures, customer satisfaction, and staff development in addition to financial metrics.

Practical Implication

Policymakers want to create aid programs that are specifically suited to the difficulties that SMEs encounter, especially with regard to their size and sector. This entails guaranteeing openness, lowering administrative obstacles, and streamlining application procedures. Programs should prioritize improving technology infrastructure, talent development, and market links in addition to tax breaks and grants. To guarantee that SMEs are aware of these programs and know how to use them efficiently, government agencies must also aggressively promote them.

Theoretical Implications

The empirical data presented in this study help to resolve the conflicting narratives in the literature on the function of government assistance, demonstrating its beneficial mediating function in the setting of emerging economies (Yimam et al., 2025). Several theoretical viewpoints, including RBV, Stakeholder Theory, Innovation Diffusion Theory, and the BSC framework, are successfully combined and validated in the study to provide a single, cohesive model for examining SME performance (Abate & Sheferaw, 2023; W. B. Mamo, 2023; Tamirat, 2024).

By offering a verified model tailored to the Ethiopian SME environment, taking into account its distinct institutional, cultural, and financial limitations, it contributes to the body of knowledge.

10. Recommendations

Along with a well-defined innovation strategy for SMEs, businesses, and policymakers should set up specialized teams to manage innovation and government funding in order to boost innovation and corporate success. Government agencies, such as the Ethiopian Ministry of Innovation and Technology, ought to establish a digital "one-stop shop" for services related to SME support and design customized

support plans for particular sectors. These programs can be continuously improved by putting feedback systems in place. Current and prospective business owners should also have access to executive training programs that concentrate on innovation management and navigating government assistance systems.

11. Limitations and Future Research Directions

Despite its limitations, this study provides insightful information about the connections between innovation, government support, and company performance in Ethiopian SMEs. Its emphasis on Addis Ababa limits generalizability, and its cross-sectional methodology makes it difficult to conclude causality. Contextual impediments to government help were not thoroughly examined, and relying on self-reported statistics may induce bias. To improve knowledge and provide useful policy frameworks for SME growth, future research should employ mixed-methods methodologies, look at moderating variables, and perform comparison studies across various African economies.

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