

ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF MANAGEMENT

Effect of Bank Digital Transformation on Operational Efficiency and Governance Performance: Moderating Role of Executive Innovation Awareness and Technical Background. A Case of Awash Bank.

BY: CHALA TADESSE HAILE

MAY, 2026
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By: Chala Tadesse Haile
Advisor: Dr Zelalem G/Tsadik

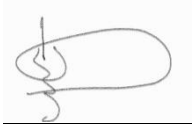
Master's Thesis Presented to the Department of Management Addis Ababa University as Part of the Requirements for the Master of Science Degree in International Business.

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DECLARATION

This is provided to declare that the thesis entitled “Effect of Bank Digital Transformation on Operational Efficiency and Governance Performance: Moderating Role of Executive Innovation Awareness and Technical Background. A Case of Awash Bank”, submitted in partial fulfilment of the requirements for the degree of Master of Science in International Businesses of Addis Ababa University. This is my original work and has not been submitted elsewhere for any other academic award. Any assistance I received throughout this research has been duly acknowledged.

Name of the candidate Chala Tadesse Date June 10, 2026. Signature 

CERTIFICATION

I confirm that I have supervised, reviewed, and assessed this thesis titled "Effect of Bank Digital Transformation on Operational Efficiency and Governance Performance: Moderating Role of Executive Innovation Awareness and Technical Background. A Case of Awash Bank" by Chala Tadesse prepared under my guidance. Accordingly, it is suitable for submission as partial fulfilment of the requirements for the degree of Master of Science in International Business.

Dr Zelalem G/Tsadik		**June 10, 2026**
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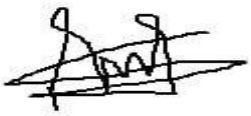
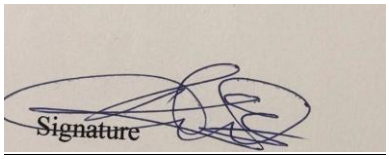
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THESIS APPROVAL

We, the undersigned members of the Board of Examiners, have reviewed and evaluated this thesis titled "Effect of Bank Digital Transformation on Operational Efficiency and Governance Performance: Moderating Role of Executive Innovation Awareness and Technical Background. A Case of Awash Bank" by Chala Tadesse. We hereby confirm that the thesis is accepted as meeting the requirements for the award of the degree of "International Businesses".

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ABBREVIATIONS AND ACRONYMS

ATM - Automated Teller Machines

AVE - Average Variance Extracted

BDT - Bank Digital Transformation

CBE - Commercial Bank of Ethiopia

CB_SEM - Covariance Based Structural Equation Modelling

CEO - Chief Executive Officer

CGP – Corporate Governance Performance

CLF - Common Latent Factor

CMV - Common Method Variance

COVID_19 - Coronavirus Disease 2019

CSA - Central Statistical Agency

DV - Dependent Variable

EIA - Executive Innovation Awareness

ETB - Executive Technical Background

f^2 - Effect Size

HTMT - Heterotrait Monotrait

IoT - Internet of Things

IV - Independent Variable

NBE - National Bank of Ethiopia

NFI - Normed Fit Index

OE - Operational Efficiency

PLS_SEM - Partial Least Squares Structural Equation Modelling

Q^2 - Predictive Relevance

R^2 - Coefficient of Determination

RBV - Resource Based View

RPA - Robotic Process Automation

TOE - Technology Organization Environment

VIF - Variance Inflation Factor

ABSTRACT

This research empirically examines the relation between bank digital transformation, executives' innovation awareness and executives' technical background, corporate governance performance, and operational efficiency. The study employed a quantitative method. Data were gathered through surveys n=345 from banking professionals (branch managers, directors, executives and board of directors) across Awash Bank's Addis Ababa regional offices. Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to analyze the data. Drawing on Dynamic Capabilities Theory, Resource-Based View, and Agency Theory, the study proposes and tests six hypotheses. Hypothesis testing confirmed two significant direct effects and four significant moderation effects, all at $p < 0.001$. Digital transformation positively and significantly influenced both operational efficiency ($\beta = 0.227$, $p < 0.001$) and corporate governance performance ($\beta = 0.203$, $p < 0.001$)' before moderation results. Furthermore, executives' technical background positively moderates the relationship between digital transformation and operational efficiency ($\beta = 0.225$). Simple slope analysis demonstrated the moderation effect at low, moderate and high level. When executives' technical background was low, slope of bank digital transformation on operational efficiency was near zero ($\beta = 0.002$), rising to 0.452 at high levels. For executive innovation awareness on corporate governance performance, slope ranged from −0.074 (low) to 0.480 (high). However, when technical background is high the slope strengthens and reaches 0.554 from low to high levels. The model demonstrated strong explanatory power with R^2 values of 0.698 for corporate governance performance and 0.688 for operational efficiency. The model demonstrated high predictive relevance ($Q^2 > 0.60$) and meaningful effect sizes for all constructs. The result demonstrates 69.8% of variance in corporate governance performance and 68.8% in operational efficiency, as a result both them shows significant explanatory power. The findings suggest that executive capability development programs should accompany digital investment strategies to maximize governance and efficiency returns.

Keywords: Bank Digital Transformation, Executive Innovation Awareness, Executive Technical Background, Corporate Governance Performance, Operational Efficiency, PLS-SEM, Awash Bank

CHAPTER ONE
INTRODUCTION

This chapter outlines the study's contextual background, the research problem, sets the research objectives, formulates the research questions, provides the rationale for the study, highlights its significance, acknowledges scope of the study, clarifies key operational definitions, and concludes the organization of the document.

1.1 Background of the Study

Banking sector across the world has experienced accelerated digital progression in a fast-changing world, propelled by the growth of information and communication technologies, changing customer demands, increased regulatory and sustainability concerns. According to Statista, the number of digital banking users globally surpassed 3.6 billion in 2025, indicating a major shift from traditional branch-based banking to digital financial services (World Bank, 2026). This global phenomenon is also evident in Ethiopia, where the National Bank of Ethiopia (NBE) has actively promoted digital financial inclusion through regulatory reforms and the National Digital Payment Strategy. In effect, mobile money account users increased from 12.2 in 2020 to 139.5 million in 2025, while mobile banking accounts grew from 9.1 million to 54 million during the same period under review (NBE, 2025). These massive shifts indicate the digital transformation has become has become a strategic importance for improving banking efficiency, customer experience, and financial inclusion both globally and in Ethiopia. The digital technology is attracting more attention among banks to revamp the traditional business models and develop more effective and responsive operation systems (Verhoef et al., 2023). Under this transformation, manual operations once carried out manually within an organization can be automated at low cost and it also minimizes processing time (Sulistyawati and Munawir, 2024).

The application of technologies like Artificial Intelligence (AI), Big Data Analytics, and Robotic Process Automation (RPA) has become the basis of the enhancement of operational efficiency. The technologies contribute to acceleration of decision-making and enable the banks to recognize the pertinent patterns and trends within the financial market. Furthermore, cloud computing offers easier ways to manage data and increases the

flexibility of the operations to address the constantly changing business demands (Shanti, 2023).

Simultaneously, bank digital transformation gives options to enhance customer experiences in a huge way. Chatbots and other virtual assistant's offer 24/7 services, which allows banks to react faster to questions and complaints. Meanwhile, the customization of the service through the customer data allows the banks to build more relevant and satisfying interactions. With the introduction of digital platforms into the banking world, the scope and scale of their activities have increased exponentially. This allows these banks to provide a wide variety of services mobile banking, digital wallets, and virtual recommended services (Alam, Azizah, & Caroline, 2025). This results in the banking industry being in a crossroad, where digital tools have been critical in improving the efficiency of its operations and ensuring its institutions become the pioneer in transforming the industry (Bueno, Sigahi & Anholon, 2023).

In the case of a bank that serves in Ethiopia like Awash Bank, the Bank Digital Transformation is likely not only to update the services and cut the costs, but also to meet the requirements of the global sustainability standards by decreasing the amount of paper usage, increasing the level of transparency, enhancing financial inclusion, and enhancing governance practices. The establishment of the Ethiopian Securities Exchange (ESX) in 2024 has elevated corporate governance to a strategic priority, as banks are now subject to heightened disclosure and accountability standards. Digitization of corporate governance in any business enterprise particularly banking industry would realize efficiency in an organization since corporate risk would be reduced to bare minimum, and the prevalence of risk among banks would be reduced considerably. Every stakeholder in Ethiopian banking industry has heard that something significant is happening as the National Bank of Ethiopia is redefining the old guidelines on composition of Board of Directors in all banks in an effort to introduce professionals who know how to use technologies (National Bank of Ethiopia, 2024). Therefore, the urgency to carry out the study is due to the critical importance of the role of the bank digital transformation in assessing the efficiency of operations and corporate governance performance in the Ethiopian Banking Industry at Awash Bank in particular (Hordofa, 2024).

The restriction to Addis Ababa is due to the concentration of head office and senior management, greater digital infrastructure maturity and practical data collection feasibility (Tadesse & Alemu, 2023). This study specifically focused on Awash Bank, and the following background information is illustrated to give a comprehensive understanding of the organization and its operational context.

Awash Bank in Ethiopia's first private commercial bank , established on November 10, 1994 following the liberalization of the financial sector after the downfall of Derg regime. The bank commenced its operation on 13 February 1995 with an initial paid-up capital of ETB 24.2 million contributed by 486 shareholders (Awash Bank, 2025). Since its establishment, the bank has significantly grown in all Key financial indicators to become the leading private commercial bank in Ethiopia. As of June 2024, Awash Bank Reported total assets of ETB 282 billion and a strongest market share in terms of assets, deposit, branch presence across the country and customer base (Awash Bank, 2024). Total number of employees surpassed 20,000.00 on June 2024 bringing massive employment opportunity for the nation and providing banking service across the country through extensive banch presence and digital banking network.

To cope with a rapidly evolving and dynamic digital banking environment, Awash Bank has undertaken significant digital transformation initiatives. These includes the introduction and expansion of Awash Pro, mobile App, and internet banking services, digital payment platforms, International VISA card payment, agency banking, merchant payment solutions, virtual branch access and fintech enabled financial services. These initiatives are intended to enhance operational efficiency, improve customer experience, financial inclusion and most importantly to strengthen the banks competitive position in Ethiopian Banking industry and beyond (Awash Bank, 2025).

1.2 Statement of the Problem

The bank digital transformation is now a strategic necessity for banks worldwide. Digital solutions like core banking systems, mobile and internet banking, big data analytics, and automation are being incorporated in the banking activities to enhance service delivery and efficiency in the internal processes. Research indicates that bank digital transformation can operate work flows, minimize manual operations, reduce the cost of transactions and

enhance the efficiency of financial services by improving speed and accuracy. Consequently, this leads to improved performance outcomes in financial institutions (Alam, Azizah, & June, 2025). Even though Ethiopian commercial banks have been gradually moving to digital banking channel like internet banking, mobile banking, ATMs, and electronic payment platforms, which in turn support improved performance outcomes in financial institutions.

Despite the increasing application of digital banking technologies, evidence suggest that the performance outcomes of digital transformation are not merely determined by technology alone but also by characteristics of top executives. Accordingly, this study examines executives' innovation awareness and executives' technical background as moderating variables influencing the relationship between bank digital transformation and operational efficiency as well as corporate governance performance. These moderators are essentially relevant in the Ethiopian banking sector following the National Bank of Ethiopia's Corporate Governance Directive No, SBB/191/2024, which reinforce requirements for board independence, diversity, professional competence in the bank governance structure (NBE, 2024). Moreover, as innovation-oriented leadership remains at a relatively early stage in many Ethiopian Banks, executives' awareness of digital innovation and their technical competence are expected to contribute a vital role in translating digital transformation initiatives into enhanced organizational outcomes (NBE, 2024; Capital Ethiopia, 2024).

The evidence shows that many banks in Ethiopia still face challenges in fully realizing the efficiency benefits from bank digital transformation. Despite these evidences, empirical evidence suggest that many Ethiopian banks continue to face challenges in fully realizing efficiency benefits of digital transformation (Hordofa, 2024). The bank digital transformation itself poses new challenges for corporate governance, such as data security risks, information transparency requirements, accountability frameworks, meeting new regulatory provisions. Studies in the banking setting beyond Ethiopia indicate that even though digitalization can enhance better administration by improving the availability of real-time data and expanding control mechanisms, it exposes them to risks unless it is controlled by well-developed governance systems (Melesse, Scholz & Ahmed, 2024).

Nevertheless, in the Ethiopian banking sector, the empirical background regarding the effect of bank digital transformation on corporate governance performance and operational efficiency is limited. The majority of available researches concentrated on customer adoption, service quality, profitability results instead of concomitant research on governance implication, including risk management, internal controls, transparency, and accountability in digital environment (Hordofa, 2024). Although there has been increasing utilization of digital technologies in Ethiopian banks, there is still a gap in knowledge regarding whether and how bank digital transformation can improve both efficiency and performance in corporate governance. It remains unclear if certain contextual institutions or strategic factors play a moderating role in these relationships. Thus, to fully understand the dynamics in this regard further investigation is needed.

1.3 Research Objectives

1.3.1 General Objective

The key objective of this study is to examine the effect of bank digital transformation on operational efficiency and corporate governance performance, with executive innovation awareness and technical background serving as moderating variables, at Awash Bank in Addis Ababa.

1.3.2 Specific Objectives

- To determine effect of bank digital transformation on operational efficiency at Awash Bank in Addis Ababa.
- To determine the effect of bank digital transformation on corporate governance performance at Awash Bank in Addis Ababa.
- To evaluate the moderating role of executive innovation awareness in the association between bank digital transformation and operational efficiency at Awash Bank in Addis Ababa.
- To investigate the moderating role of executives' technical background in the association between bank digital transformation and operational efficiency at Awash Bank in Addis Ababa.

- To examine the moderating role of executive innovation awareness in the association between bank digital transformation and corporate governance performance at Awash Bank in Addis Ababa.
- To evaluate the moderating role of executives' technical background in the association between bank digital transformation and corporate governance performance at Awash Bank in Addis Ababa.

1.4 Research Questions

1. How does the implementation of bank digital transformation initiatives influence operational efficiency at Awash Bank in Addis Ababa?
2. How does bank digital transformation contribute to improving corporate governance practice at Awash Bank in Addis Ababa?
3. What is the moderating role of executive innovation awareness with the relations between bank digital transformation and operational efficiency at Awash Bank in Addis Ababa?
4. What is the moderating role of executives' technical background with the relations between bank digital transformation and operational efficiency at Awash Bank in Addis Ababa?
5. What is the moderating role of executive innovation awareness with the relations between bank digital transformation and corporate governance performance at Awash Bank in Addis Ababa?
6. What is moderating role of executives' technical background in the relationship between bank digital transformation and corporate governance performance at Awash Bank in Addis Ababa?

1.5 Significance of Study

This study contributes to the existing body of knowledge on bank digital transformation in the Ethiopian Banking industry with specific focus on Awash bank by examining how executives' innovation awareness and executives' technical background influence the relationship between bank digital transformation, operational efficiency and corporate

governance performance. By drawing the resource Based View (RBV), Dynamic Capabilities Theory, Agency Theory, and Technology Organization Environment (TOE) framework, the study provides a wider understanding of the leadership factors that shape bank digital transformation outcomes,

From a practical standpoint the finding is expected to assist Awash Bank's management in identifying the leadership capabilities required to enhance the outputs of digital transformation, in addition the study may contribute to decision making related implementations, and governance improvement ultimately enhancing operational efficiency and organizational performance.

The outcome of study also contributes important inputs for policymakers, such as the governing body, National Bank of Ethiopia. As the National Bank of Ethiopia pursuing to modernize Commercial Banks board configuration and Corporate Governance reform agenda, the findings could help policies aimed at solidifying executive capabilities, innovation-lead leadership, and Corporate Governance positive outputs across domestic banking sector and elsewhere.

1.6 Scope of the Study

The study comprises Bank Digital Transformation as independent variable with operational efficiency and corporate governance performance as dependent variables. Moreover, executives' innovation awareness and executives' technical background represent moderating variables. Awash Bank was selected to conduct the study and geographically limited to the capital city Addis Ababa, Ethiopia. As the city is the financial hub of the county and center of many financial head offices including Awash bank as well as advanced digital infrastructure compared to other regionals of Ethiopia we have restricted to this area (Tadesse & Alemu, 2023). It investigates relationship of two significant variables, bank digital transformation with operational efficiency and corporate governance performance as well as the moderating impacts of executives' innovation awareness and executives' technical background in Awash Bank. The study uses a cross- sectional design, which was

conducted between October 2025 to June 2026, capturing a single point in time snapshot of bank digital transformation at Awash Bank.

1.7 Operational Definition of Terms

Table 1. 1. Definition of Terms

Term	Definition	Operationalization	Source
Bank Digital Transformation	Fundamental change process, enabled by the innovative use of digital technologies accompanied by strategic leverage of key resources and capabilities, aiming to radically improve an entity and redefine its value proposition for its stakeholders	For this study, it specifically means the bank's effective use of digital technologies such as online lending, e-wallets, and mobile apps to exceed customer financial needs.	Gong, C., & Ribiere, V.(2021)
Operational Efficiency	It is the ability of an organization to provide services with lowest possible cost though maintaining acceptable quality and speed of service delivery	In this research, it is measured by how Awash Bank reduces costs, processing times, errors, and improves productivity in its operations	(Shao, 2021)
Corporate Governance Performance	Corporate Governance Performance refers to the effectiveness of the structures, processes, and mechanisms used to direct and control an organization in order to achieve transparency, accountability, and organizational objectives.	It includes factors like board independence, audit and risk committee functionality, policy compliance, and transparent decision-making.	(Li & Lou 2024)
Executive Innovation Awareness	Bank executives recognize, value, and encourage innovation as an important strategy for change. The potential benefits and risks linked with innovation initiatives.	It is measured by how well Awash Bank executives recognize digital opportunities, seek new technologies, and support innovation initiatives.	(Vial, 2019)
Technical Background	The knowledge, skills, and experience an individual possesses in technology-related fields such as	In this research, technical background refers to formal qualifications, prior technical roles, and	(Gong & Ribiere, 2021)

Term	Definition	Operationalization	Source
	information systems, software development, data analytics, or digital infrastructure management.	demonstrated proficiency with digital tools among Awash Bank's executives and staff.	

1.8 Organization of the Document

Relevant literature reviews focusing various global banking experience theoretical frameworks and vital important concepts discussed in Chapter Two. Chapter three gather the research methodology and design employing the quantitative approach, data collection methods, sampling, and analysis techniques. Chapter four deals with data analysis based on information gathered from Awash Bank in Addis Ababa, combining statistical results with thematic interpretations and discussion. Summary, key and important findings, discussions, recommendations and future research direction will be covered in Chapter Five.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

This chapter reviews the theoretical frameworks and empirical literature related to digital bank transformation. It begins with an overview of the theories underpinning digital transformation in the banking areas. The chapter then examines existing studies on the effects of digital transformation on operational efficiency and corporate governance performance. Special attention is given to the moderating roles of executive innovation awareness and technical background. The chapter concludes with a summary of findings that inform the study's conceptual framework and hypotheses.

2.1. Theoretical Foundations

This study is anchored in four complementary theoretical perspectives: Resource-Based view, Dynamic Capabilities Theory, Agency Theory and the Technology Organization Environment (TOE) Framework. Together these theories provide a comprehensive lens for understanding how Bank Digital Transformation influence organizational performance and how executive characteristics shape the relationship.

2.1.1 Resource Based View (RBV)

The Resource Based View (RBV), originated by Barney (1991), conveys that organizations attain sustainable competitive advantage through valuable, rare, inimitable, and non-sustainable resources. In current digital age, technological infrastructure, digital competencies, trained and skilled employees, and leadership capabilities, are considered strategic resources that can elevate organizational performance. Within the banking sector, successful digital transformation depends not only on the adoption of technology but also on the effective use of internal resource and capabilities. RBV hence provides an important foundation for understanding hoe Bank Digital Transformation contributes to operational efficiency and corporate governance performance.

2.1.2 Dynamic Capabilities Theory

Dynamic capabilities theory was initially introduced by Teece, Pisano, and Shuen (1997) to explain how organizations deal with the rapidly changing business environments. The theory focuses on the organization's ability to sense opportunities, seize them, and continuously reconfigure resources to respond to technological and market changes. This theory highlights the importance of leadership capabilities in gearing organizational adaptation and sustaining performance in an increasingly digital environment.

2.1.3 Agency Theory

The interaction among owners and leaders including conflicts that may arise is the main focus of Agency Theory. It was originally discovered by Jensen and Meckling (1976). This theory emphasise on the significance of governance structure, accountable mechanisms and managerial oversight in ensuring the organizational decisions align with stakeholders' interest. While Banks continue to invest in digital transformation initiatives, effective governance become increasingly vital to manage risks, in placing transparency and maximize the value generated from digital investments. Hence, agency theory therefore lays strong foundation for examining corporate governance performance within the study.

2.1.4 Technology Organization Environment (TOE) Framework

Developed by Tornatzky & Fleischer (1990) which determines how technological, organizational and environmental factors impacts the execution of innovations. The framework envisages the success of Digital Transformation depends appropriate updated technologies, organization adaptability and external dynamic environment. Ethiopian banking sector where Digital Transformation is shaped by regulatory reforms and changing market demands. Technology Organization Environment provides a combined perspective for understanding the drivers and challenge of digital transformation.

2.1.5 Relevance of the Theories to the study

The four theories complement one another in describing the study constructs. RBV highlights the strategic value of digital resources and leadership capabilities. Dynamic Capabilities Theory signifies hoe banks adapt to technological change. Agency Theory

demonstrates insights in to governance effectiveness and managerial accountability. The TOE Framework explains the contextual factors influencing digital transformation adoption. Together, these theories provides a robust foundation for examining the link between bank digital transformation, operational efficiency and corporate governance performance, as well as the moderating roles of executives' innovation awareness and executives' technical background.

The captioned theories elaborate valuable insights, the integration among constructs to clearly establish which theoretical perspective primarily supports each hypothesis in the subsequent sections. Specifically, the Resource Based View (RBV) primarily supports hypothesis one and hypothesis two, as it explains how Digital Capabilities serve as strategic resources that directly enhance organizational outcomes. The Dynamic Capabilities Theory primarily reinforces hypothesis three and hypothesis five, as it explains how executives' innovation awareness enables organizations to sense and seize digital opportunities, thereby promoting the effectiveness of digital transformation initiatives. Agency Theory primarily reinforces hypothesis two and hypothesis six, as it explains how governance mechanisms and executive oversight particularly technical expertise reduce information asymmetry ,enhance transparency and accountability in digital governance contexts. Finally, TOE Framework provides the principal contextual framework for the entire study, explaining how technological readiness, organizational adaptability, and environmental pressures regulatory reforms collectively influence digital transformation results. This integration of theories ensures that each hypothesis is grounded in an appropriate theoretical foundation, thereby strengthening the conceptual rigor of the study

2.2. Empirical Reviews

2.2.1. Bank Digital Transformation in the Banking Sectors

The increasing number of digital banking channels is one of the current trends, which provide customers with unmatched accessibility and access to financial services. According to Kaur et al. (2021), the utilization of digital banking channels has become a trend especially in the emerging economies due to increased internet facilities and mobile phone usage. In addition, Bank Digital Transformation has helped banks to simplify the

work, save money, and enhance service delivery with the help of new technologies including artificial intelligence (AI) and machine learning (ML) (Rodrigues et al., 2022). The emergence of Fintech companies has stimulated the innovation of the banking industry, introduced competition and made the existing markets adapt and innovate to satisfy changing customer needs.

Furthermore, the digital age has seen the beginning of a customer centric paradigm shift, where banks are becoming more concerned with providing customized and quality experiences through digital touchpoints. As explained by Chauhan et al. (2022), customer experience has emerged as a competitive tool in banks. It requires the implementation of user-friendly interfaces, predictive analytics and AI-based recommendation engines to accommodate individual preferences and predict customer needs. Additionally, digital banking is likely to expand the potential in the fields of payments, identity verification, and risk management due to the convergence with new technologies like block chain and IoT (Indriasari, et al., 2022). All these trends highlight the disruptive nature of digitalization in the banking sector, which is likely to bring efficiency, agility, and customer-centricity to the goal of sustainable growth and competitiveness.

Despite the prevalence of barrios in this regard the actual trajectory of bank digitalization has yielding significant efficiency and competitiveness (Rodrigues et al., 2022) bringing persistent digital investment both necessary and urgent. Nonetheless, irrespective of these obstacles, the digital revolution has introduced a plethora of opportunities and tendencies in the banking industry that transformed the conventional tradition of conducting business and promoted its efficiency and user-friendliness in general. Since the emergence of digital banking channels, all the way to the introduction of new technologies into the picture, including artificial intelligence and machine learning, banks are set to use the bank digital transformation as the driver sustainable growth and competitiveness in the digital time (Rodrigues et al., 2022). With the further development of the banking sphere, the process of digitalization become important to those organizations that want to succeed in the becoming more digital world.

Notably, contradictory findings exist in the wider literature. While Rodrigues et al. (2022) highlights positive efficiency gains, other scholars remarks the relationship between digital investment and performance outcomes is not uniformly positive and depends on organizational readiness, implementation quality, and contextual factors (Popova, 2021; Klus et al., 2019). Some studies have found that initial digitalization efforts can temporarily disrupt operations and reduce efficiency before improvements are realized. The review of Ethiopian Banking Digitalization remains restricted, as only a single paragraph touches on the Ethiopian context despite it being the study setting. More comprehensive examination of Ethiopia's unique regulatory environment, technological infrastructure challenges, and banking sector structure is needed to contextualize the findings

2.2.2. Operational Efficiency in Banking

Operational efficiency in banking sector can be described as the capacity of banks to offer financial services at minimal cost to consumers and at the same time delivering quality services to their clients, complying with regulatory forms and maintaining the levels of risk management (Aysan et al., 2021). Efficiency indicators usually depend on the cost-to-income ratios, time spent on the processing of the transactions, rates of errors, and the efficiency of the utilization of resources (Koetter et al., 2012).

Studies undertaken in Ethiopia and East African also indicate the importance of operational efficiency in the banking sector. For instance, Alemu (2021) found that inefficiencies in Ethiopian banks are usually associated with limited banking technological integration, exaggerated operational costs, and process delays. Similarly, Worku and Tilahun (2022) reported that improvements in digital banking services contributed positively to operational performance and service delivery. Unlike banks in developed markets, where efficiency efforts are increasingly focused on advanced analytics artificial intelligence and process optimization, Ethiopian banks continue to face challenges such as underdeveloped digital infrastructure, regulatory hurdles, technology adoption, shortage of trained workforce. As a result, improving operational efficiency through digital transformation remains a strategic priority for the sector.

The banking sector is highly process-intensive and thus highly vulnerable to all forms of inefficiencies caused by manual processing, use of legacy systems, and adoption of various and dis-integrated workflows. These inefficiencies may be removed by the bank digital transformation, i.e., the automation of all routine operations, the combination of data flows within system, and providing a real-time decision-making (Bharadwaj et al., 2013). Empirical evidence is gradually accumulating to support the fact that banks are becoming more efficient in terms of their operational efficiency as they increase in the level of digitalization compared to banks of lesser levels of digitalization (Agwu, 2020).

Synthesizing the Evidence on Operational Efficiency, Aysan et al. (2021), Koetter et al. (2012), and Bharadwaj et al. (2013) collectively establish that digitalization significantly cuts operational costs and enhances service delivery time through automation and integration of workflows. Studies conducted by Alemu (2021) and Worku and Tilahun (2022) confirm that digital banking services positively contribute to operational performance, though Alemu's findings suggest that inefficiencies persist due to limited technological integration. This implicates a gap between digital adoption and realized efficiency gains in the Ethiopian context. Self-opposing findings emerge when comparing developed and emerging market contexts. While Agwu (2020) recommends digitalized banks are consistently more efficient than non-digitalized banks, other research (Popova, 2021; Klus et al., 2019) indicates that efficiency gains depend hugely on organizational readiness, workforce capabilities and adequate infrastructure factors that are often lacking in emerging markets like Ethiopia. The discussion of Ethiopian Banking remains quite limited despite being the study context, with only two studies (Alemu, 2021; Worku & Tilahun, 2022) cited. A more comprehensive examination of Ethiopia's specific digital infrastructure challenges, regulatory developments, and comparative data across banks is required to adequately contextualize this study.

2.2.3. Bank Digital Transformation Effect on Operational Efficiency

The bank digital transformation has emerged as an urgent innovation and performance driver in the banking industry, significantly changing the structures of operations and provision models of services. Optimization of operations, customer experiences, and

lowering operational costs have become possible due to the adoption of digital technologies like artificial intelligence (AI), big data, block chain and automation tools by banks (Li & Lou, 2024). This change is especially notable in the developing economies where the old banking systems were usually typified by inefficiency, high cost and inaccessibility. Transition to digital banking does not only solve such problems but also generates many new possibilities of financial inclusion and market growth.

Enhancement in operational efficiencies in banking is one of the most notable effects of BDT on the operations of the bank. Automated systems are replacing traditional banking processes that tend to be manual and require a lot of paperwork to complete the workflow, and reduce human error (Agwu, 2020). The use of automation tools, such as AI-based software, is used to take care of repetitive activities such as data entry, account management, and transaction processing. This change helps to decrease processing times and increase the precision, and enable banks to distribute resources more efficiently, resulting in much cost savings and performance improvements (Indriasari, et al., 2022).

One major advantage of Bank Digital Transformation that banks get is cost reduction. Moving physical branches to digital platforms, banks would be able to reduce their overheads in terms of real estate, staffing and physical facilities considerably (Popova, 2021). Through digital platforms, the customers can now access the banking services remotely, and this limits the large branch networks. Moreover, AI and machine learning algorithms applied to the work of the bank aid in enhancing its financial forecasts, risk management, and decision-making to make decisions more cost-effective (Kshetri, 2016).

Such savings may be reinvested in innovative services in increasing the overall competitiveness in the banking industry. Drastic customer experience and service delivery are also significant changes that bank digital transformation delivers. Customers are now afforded the opportunity to conduct transactions and access financial services at their convenience without being obliged by the operating hours of the branch with the outline of mobile banking, platforms, and self-service options. Such accessibility is especially significant in emerging economies where the geographical barriers and a low number of branches have always limited access to the banking services in the past. The digital

channels are easy and consistent to use in all types of devices, which enhance customer satisfaction and loyalty to a greater level (Aziz and Naima, 2021).

Besides improving the interaction with customers, the BDT has a significant effect on the risk management in banking practices. Banks can use advanced data analytics and AI-powered tools to track transactions in real time, identify anomalies, and reduce the risks more efficiently (Klus et al., 2019). Predictive analytics, can determine the possibility of credit risks prior to their occurrence, which allows making decisions in advance. Additionally, block chain technology provides safe and clear ways to deal with transactions, and the risk of fraud and cyberattacks is minimized (Kshetri, 2016).

These are the technological innovations that enhance resilience of banking functions, especially in areas that have less robust regulatory frameworks. The implementation of digital technologies contributes to the resilience of the work of banks, allowing them to respond to changing market conditions and customer demands in a short period of time. An example is when the COVID-19 pandemic struck, the banks that had already digitized themselves were in a better position to follow through with their operations remotely at the time when the pandemic struck, and service continuity to their customers (Awotunde, et al., 2021).

The scalability of the digital platforms also facilitates this resilience because it is able to support growth without physical expansion. This means that the banks would be able to scale their operations quickly and add new services to address the changes in demand to provide them with a competitive advantage in volatile markets. The BDT is also transforming the conventional banking labor force causing a change in skills demand and the employment structures. The growing use of technology has eliminated some jobs, including a teller and back-office employees, and opened opportunities to tech-savvy employees who, besides managing digital platforms and analyzing data, can be innovators (Indriasari, et al., 2022).

The change requires reskilling and upskilling programs, with banks focusing on aligning their human capital with the capabilities of a digital-first world. Although such a transition might be a challenge within the short term, it eventually results in a more flexible and competent workforce that can facilitate constant work process instigations. Although the

advantages of the bank digital transformation are obvious, the process itself does not pass without challenges. Switching to the digital mode of functioning implies large financial costs of technology, cybersecurity, and infrastructure. These expenses are prohibitive to the banks in the developing economies, especially in the areas with uncertain economic status and access to capital (Popova, 2021).

Moreover, an adequate regulatory environment is an additional prerequisite of successful Bank Digital Transformation implementation, which is not always available in developing countries. Regulatory inconsistency, as well as the absence of digital infrastructure, may make the transformation initiatives more problematic and leave the banks vulnerable to operational risks (Klus et al., 2019).

To sum up, the Bank Digital Transformation has significantly influenced the way the banking operations work and achieved operational efficiencies, minimized cost, and improved customer experiences. The digital banking transformation allows banks to provide more convenient and adaptable services especially in developing economies whereby the conventional banking systems have failed to satisfy the customers. Moreover, the development of AI, data analytics, and automation is changing the risk management practices and enhancing the resilience of the operations. Evidence from diverse banking contexts suggest BDT benefits generally outweigh implementation costs when supported by adequate infrastructure and regulatory frameworks (Popova,2021; Klus et al., 2019) though this balance may differ in Ethiopia's emerging market context . Due to the ever-changing Bank Digital Transformation, banks adapting to them would be better placed to withstand future shocks and seize the opportunities that come with the new transformation in the financial sector.

2.2.4. Bank Digital Transformation Effect on Corporate Governance

Sama et al., (2022) examine both internal and external dimensions of corporate governance in digitalization, emphasizing the impact on firm value and governance challenges in digital environments. People who are concerned with having good corporate governance are highly impacted by digital processes. They raise several concerns, such as e-reputation, price variability, physical goods non-based operations, board information protection, eliminating intermediaries and the emergence of new players. This is because the

challenges are necessary because of the importance of assuring shareholders and the stakeholders of the process involved in good corporate governance. Bank digital transformation is the key to good corporate governance in the state of challenges. The use of BDT is highly relevant in enforcement of corporate governance.

Moreover, Alsayegh et al. (2020) suggests that the bank digital transformation affects corporate governance significantly. In the present digital age and increased performance on corporate governance, the Board of Directors may look into key operating performance indicators. Therefore, quick digital change not only has transformed service delivery in Ethiopian banking industry, but also has critical consequences to corporate governance frameworks.

2.2.5. Digital Tools for Board Oversight and Transparency

Corporate governance increasingly depends on well-developed digital tools to enhance oversight and ensure transparency across the bank. Dashboards and real time information updates replaced paper and report delays. Such useful technologies can enhance information access for Board Directors giving them to oversee major performance and risk indicators continuously rather than waiting for regular periodic meetings (Alsayegh et al., 2020). by utilizing data analytics and Artificial Intelligence Boards can conduct predictive modeling that significantly improving strategic decision making. Furthermore mechanisms like virtual shareholder meetings have enhanced transparency.

At the same time, the hurdle of regulatory compliance in Ethiopian banking industry has grown far complex for manual workflows, giving a higher interest for application of to regulatory compliance technology. In the banking sector, where compliance failures entails serious reputational and financial penalties, regulatory compliance technology acts as a vital arm of corporate governance. Also it reduces human error, minimizes compliance costs, and gives regulators with, data trails, by reinforcing the overall integrity of the corporate governance framework.

Synthesizing across studies, Alsayegh et al. (2020) and other sources collectively suggests that digital governance tools enhance Board effectiveness through real-time information access, predictive analytics, and enhanced transparency mechanisms. The evidence implies

that digital tools significantly reduce information asymmetry between management and boards, enabling more informed oversight. Inconsistent findings emerge when considering implementation effectiveness. While Digital tools theoretically improves governance, some studies have found that Boards often lack the digital literacy to effectively utilize these tools, and that implementation challenges can potentially reduce anticipated benefits. Furthermore, the dependence on automated systems introduces new risks of algorithmic bias and data security exposure that can compromise governance integrity. The discussion of Ethiopian banking industry digitalization remains underexplored, with lacking specific evidence cited regarding the adoption or effectiveness of digital governance tools in Ethiopian banks. Regulatory compliance challenges specific to Ethiopia's banking sector are mentioned but not substantiated with regulatory reports or empirical studies from the Ethiopian context.

2.2.6. Risks of Digital Governance Failure

Reliance on digital technology has double sided risk by exposing to governance failure. The governing body would face severe exposures associated to cybersecurity violation of data privacy and algorithmic manipulation. Unexpected cyber attack can destroy a firm's reputation and damage shareholder value overnight. Likewise, hidden algorithms used in automated decision-making can majorly introduce biased practices that boards fail to observe (Gomber et al., 2018). Avoiding traditional intermediaries and accepting non-traditional players into the ecosystem complicates accountability making robust digital risk governance an absolute necessity.

Synthesizing the evidence from Gomber et al. (2018) and related literature, the joint finding is that digital governance introduces significant risks including cybersecurity vulnerabilities, data privacy violations, algorithmic bias, and accountability challenges. Those risks are not theoretical empirical evidence suggests they are prevalent and consequential in digitalized banking environments. Some contradictory findings exist regarding the net effect of digitalization on governance risk. While Gomber et al. (2018) focuses the emergence of new risks, other scholars (e.g., Alsayegh et al., 2020) emphasize the risk-reduction benefits of digital governance tools through enhanced monitoring and compliance capabilities. This suggests a double sided relationship where digitalization both

mitigates traditional governance risks (through automation and transparency) and introduces new categories of risk (cyber, algorithmic). The discussion of Ethiopian Banking Digitalization remains limited despite the study context. There is no proper evidence is cited regarding cybersecurity risks, data privacy concerns, or digital governance failures in Ethiopian banks, leaving a significant contextual gap in the literature review.

2.2.7. Evidence from Emerging Markets

Such important changes are essentially prevalent in growing markets where bank digital transformation outsmarts the existing legal and regulatory frameworks. With this sense, Bank Digital Transformation supports as a critical catalyst for institutional maturity. In the Ethiopian Banking Industry digital change has substantially changed service delivery through mobile money and digital wallets, pushing a parallel evolution in Corporate Governance Frameworks (Tchamyou et al., 2019).

Suggestions from emerging economies indicates that while digital adoption connects the information asymmetry gap between insiders and external outsiders it also exposes institutional vulnerabilities (Kaufmann et al., 2021). Though legal support for investors can be weaker in emerging markets strong internal digital governance becomes the primary mechanism for assuring shareholders that their capital is being managed safely and ethically. Ultimately as Alsayegh et al. (2020) hints the modern board effectiveness is heavily relied to its digital literacy, turning digital transformation from a mere IT upgrade into the very backbone of current corporate governance.

2.3. Identified Research Gaps

To fill these gaps is critical in developing academic and operational insights of the impacts of bank digital transformation on operational efficiency and governance performances in commercial banks.

Further more existing studies on Bank Digital Transformation and bank performance categorically ignore the critical moderating roles of executives' leadership characteristics. Specifically, there is a separate lack empirical evidence regarding how executives'

innovation awareness and executives' technical background condition the success of digital strategies. This study explicitly addresses the conspicuous omission by positioning executive innovation awareness and technical expertise as a key moderatos within the Ethiopian Banking industry with specific focus on Awash Bank.

As far as Ethiopian banking industry is concerned ,the existing studies are insufficient because they primarily examine direct effects of Digital Transformation on performance outcomes without considering the role of leadership characteristics. This exclusion is significant because prior research suggests that lexecutive capabilities can substantially amplify or reduce the effectiveness of technology investments (Teece, 2007; Hambrick & Mason, 1984). Focusing exclusively on technology performance linkages, existing studies fail to tress the full complexity of how Digital Strategies translate into organizational outcomes, leaving a critical gap in understanding when and why digital transformation succeeds or fails

The rationale behind selecting Executive Innovation Awareness and Executive Technical Background as moderating variables theoretical justification is needed. These specific executive characteristics were chosen as moderators rather than other leadership traits. Drawing on Agency Theory (Jensen and Meckling, 1976) would strengthen the justification, as this theory posits that organizational outcomes are partially predicted by managerial background characteristics and cognitive bases. Similarly, Dynamic Capabilities Theory (Teece, 2007) provides a theoretical basis for why executives' innovation awareness and technical expertise are critical for sensing and seizing digital opportunities.

2.3.1. Limited Focus on Bank Digital Transformation in Ethiopian Banking

The first identified gap is the limited empirical focus on bank digital transformation within the Ethiopian Banking Industry. The majority of available literature focus on developed economies, with which digital infrastructure, regulatory, and managerial resources are comparatively developed (Vial, 2019). Therefore, the results of these settings cannot be immediately transferred to the context of Ethiopia and Ethiopian banks that have different institutional, technological and regulatory frameworks.

Empirical research on banking digitization in Ethiopia largely focuses on customer utilization of mobile banking and electronic systems, and it does not focus on the internal organizational consequences, such as operational efficiency and corporate governance performance (Alemu, 2021). This tunnel vision restricts the insight on the overall strategic implication of bank digital transformation. Considering the growing digital investment by Awash bank, there is an obvious necessity to collect empirical data that would study the impact of BDT on the internal performance dimensions on Ethiopian commercial banks (NBE, 2024).

2.3.2. Lack of Comparative Analysis in Emerging Markets

The other gap in the literature that is noteworthy is the absence of comparative studies that can analyze the outcomes of BDT between multiple banks operating in the same emerging market. Current studies tend to take either single-case study or cross-country studies ignoring cross-country variations (Asongu & Odhiambo, 2020).

The comparative analysis is especially relevant in Ethiopia, where the commercial banks vary in terms of their scale, ownership, technological maturity, and in terms of governance practices to the extent that they differ significantly in size. Awash bank is a representation of various strategic orientations and phases of digital maturity, which makes them the right participants of comparative analysis. Such comparative studies are not available, and this restricts the possibility of identifying best practices and situational factors that drive the results of bank digital transformation (NBE, 2024).

2.4. Hypotheses Development

In this chapter, the theoretical and empirical literatures on BDT, OE and CGP in the banking industry have been reviewed. The chapter was based on Resource Based View, Dynamic Capabilities Theory, Agency Theory, and the TOE framework, giving rise to a fairly elaborate conceptual framework and being used to justify six hypotheses. The corelation of the captioned of four theories is operationalized as follows: RBV explains the direct effects of digital resources on performance outcomes of hypothesis one and two. Dynamic Capabilities Theory describes how Executive Innovation Awareness enables organizations to sense and grab digital opportunities hypothesis three and five. Agency

Theory demonstrates how Corporate Governance mechanisms and executive oversight address information asymmetry and accountability hypothesis two and six. Additionally to that, TOE provides the overarching contextual framework for understanding technology adoption dynamics in the Ethiopian banking environment.

The review indicated that there were major research gaps concerning the contextual focus, comparative analysis and governance integration in the Ethiopian banking studies. Through these gaps, the research paper makes a contribution to both theory and practice as well as give a solid background through which empirical research of Awash Bank can be conducted.

2.4.1. Bank Digital Transformation and Operational Efficiency

The BDT has been well known as one of the major sources of efficiency in the banking sector. Digital technologies can greatly decrease the cost of operations and accelerate the speed of the services delivered by automatizing manual operations, integrating information systems, and real-time data processing (Bharadwaj et al., 2013). Relying on the Resource-Based View, digital capabilities may be characterized as strategic resources, which help banks to maximize the use of resources and enhance the efficiency of the processes (Vial, 2019).

Empirical research has always shown that there is a positive correlation between the bank digital transformation and operational efficiency. Hernando and Nieto (2007) discovered that the adoption of digital banking minimized the operating costs in European banks and enhanced productivity. On the same note, that U.S. banks taking advantage of automation and analytics were more cost-efficient than those that were less digital.

Bank digital transformation has been found to overcome structural inefficiencies caused by the legacy systems and manual operations in emerging markets. Asongu and Odhiambo (2020) discovered that African banks that embraced the use of digital platforms realized impressive cost cuts in the cost of processing transactions. In Ethiopia, there is limited available empirical data but regulatory reports indicate that banks that have made investments in the digital infrastructure have enhanced the efficiency of payment processing and mitigated operational bottlenecks (NBE, 2024). Evidence from Ethiopia

explains that digital transformation contributes positively to banking performance and efficiency. A study on Ethiopian commercial bank found to adoption of digital banking channels, including mobile, internet banking and ATMs significantly enhanced bank performance by enhancing service delivery and operational effectiveness (Kassaye & Alamirew, 2025). Similarly, the National Bank of Ethiopia reported a significant growth in digital usage indicating the increasing role of digital technologies in improving banking operations and service delivery (NBE, 2025). This evidence leads to the following hypothesis in the study:

H_1: Bank Digital Transformation has a positive impact on operational efficiency in Awash Banks.

2.4.2. Bank Digital Transformation and Corporate Governance Performance

Transparency, accountability, maintaining regulatory compliance and effective monitoring mechanisms are vital to the performance of corporate governance. Agency Theory recommends that the lack of information in the management and stakeholders creates information asymmetry, which lacks the effectiveness of governance. Bank Digital Transformation helps to alleviate these agency problems through increasing the transparency of information, automating the reporting process, and enhancing the internal control system (Tsai et al., 2020).

The beneficial effects of the BDT on the governance outcomes are supported by empirical studies. Mikalef et al. (2020) established that the quality of decision-making and oversight by the board was enhanced by the presence of digital analytics capabilities. On the same note, financial institutions had improved compliance and accountability through the digital governance tools.

Bank Digital Transformation is very critical in offsetting institutional shortcomings in emerging economies. According to Asongu and Odhiambo (2020), digital technologies enhance the performance of governance because they hand over reporting to a standard and enhance regulations compliance. In the Ethiopian context, a set of new digital reforms by the National Bank of Ethiopia have enhanced the transparency and the quality of reporting in the banking industry, but the performance is seen to differ among banks (NBE, 2024).

H_2: Bank Digital Transformation has a positive impact on corporate governance performance in Awash Banks.

2.4.3. Moderating Role of Executive Awareness of Innovation on Bank Digital Transformation and Operational Efficiency

High levels of innovation awareness among the executives have a great impact on how bank digital transformation projects become operational. The Dynamic Capabilities Theory suggests that leaders are the key facet in the perception of technological opportunities and the restructuring of organizational resources to lead to performance advantages (Teece, 2014).

Empirical evidence defines that executive innovation awareness enhances the efficiency gains of bank digital transformation. Warner and Wäger (2019) discovered that innovation-oriented leadership increased the alignment between digital technologies and business processes, which led to an increased efficiency gain. Likewise, Khin and Ho (2019) showed that support by the leaders increased the operational effects of digital investments in banks. The levels of innovation awareness among the executives in the Ethiopian banking sector, where innovation remains a relative new concept, are essential to the resistance to change and possible ineffective technology implementation (Alemu, 2021).

H_3: Executives' awareness of innovation positively moderates the relationship between bank digital transformation and operational efficiency.

2.4.4. Moderating Role of Executives' Technical Background on Bank Digital Transformation and Operational Efficiency

Leadership technical background contributes great importance to the effective implementation of the BDT in banking industry. Leaders with technological expertise are usually better chance to understand the complexities of technological dynamism helping organizations to evaluate digital investment opportunities, and guide through technological change. Recent empirical research indicates that technical background of executives' substantially strengthens the relationship between bank digital transformation and organizational performance outcomes. A study on commercial banks found that the interaction between bank digital transformation and executives' technical background positively improves bank efficiency, indicating that technologically knowledgeable

executives help organizations better leverage digital technologies to enhance operational outcomes (Liu, Zhang, & Chen, 2023).

Consequently, executives with better technical expertise could facilitate the successful implementation of modern and advanced technologies such as AI, data analytics & digital platforms. Empirical research also shows that financial institutions led by executives with digital and technical background demonstrate higher levels of technology adoption and productivity improvement because leaders are more capable of evaluating technological risks and opportunities (Kikuchi, 2025). In addition, studies indicate that executives with digital expertise enhance organizational information flow and technological utilization, which strengthens the positive effect of Bank Digital Transformation on firm performance and governance outcomes (Zhang, 2024).

H_4: Executives' technical background positively moderates the effect of bank digital transformation on operational efficiency.

2.4.5. Moderating Role of Executives' Awareness of Innovation on Bank Digital Transformation and Corporate Governance Performance

The effectiveness of bank digital transformation in the banking industry does not merely depend on the richness of bank digital technologies. It is also on how senior executives perceive and understand the innovation. Those executives who are well prepared and aware of technological development and innovation trends. They are more capable of recognizing the strategic importance of digital applications. While executives gets strong innovation awareness, they tend to encourage and practically support digital investment decisions and facilitate the application of new technologies in to banking operations. Hence the positive effect of bank digital transformation on organizational performance becomes more obvious (Liu, Zhang, & Chen, 2023).

Additionally, Executives' Awareness of Innovation plays significant role in creating a supportive organizational environment where digital initiatives can be successfully implemented. Leaders who understand innovation are more likely to encourage experimentation, knowledge transfer, and creating conducive environment across departments, which are quite important for the successful implementation of digital

strategies. As a result Bank Digital Transformation activities become more effective in promoting and enhancing operational efficiency and governance practice within financial institutions (Ghertescu et al., 2024).

The existing literature posits that executives' awareness of innovation plays a vital moderating role in the relationship between bank digital transformation and organizational performance outcomes. Therefore, leadership awareness of innovation strengthens the relationship between bank digital transformation and organizational results, making it an important factor to reconsider in studies examining bank digital transformation in the banking sector (Kikuchi, 2025; World Bank, 2025).

H_5: Executives' awareness of innovation positively moderates the effect of bank digital transformation on corporate governance performance.

2.4.6. Moderating Role of Executives' Technical Background on Bank Digital Transformation and Corporate Governance Performance

The technical background of the executives is also important to handle the digital governance systems, cybersecurity risks, and regulatory requirements of compliance. Digital governance tools are also more reliable and reliable when applied by technically competent executives (Hambrick and Mason, 1984). This argument is supported using empirical evidence. Tsai et al. (2020) established that digital compliance and risk management systems were more effective with technical expertise among the executives. The study by Zhu and Jin (2023) also reported that the executives in the IT background gained greater governance impacts due to bank digital transformation programs.

In the Ethiopian context, technically competent executives can play a critical role in strengthening transparency, accountability and regulatory compliance as digital governance capabilities continue developing (World Bank, 2025) In this connection, the research hypothesizes:

H_6: Executives' technical background positively moderates the relationship between Bank digital transformation and corporate governance performance.

2.5. Conceptual Framework

A conceptual framework refers to a set of concepts, beliefs, expectations, assumptions, and even theories that underlie one research (Ravitch & Riggan, 2017). It is also said to be a product that is written or visual, which elaborates the crucial factors, variables or concepts in a narrative or graphical expression and the alleged relationship between them.

They also indicate that the purpose of using a conceptual framework is to give the guidance needed on what the empirical research should be performed or executed as required. The conceptual frameworks are built on the perception of the researcher concerning the phenomenon. Identifying the existing models or theories to adopt assists in refining the goals of the researcher, formulating applicable research questions, selecting appropriate methods, and determining the threats to the validity of the deductions of the study (Lester, 2024). It also provides a systematic framework of empirical testing on the quantitative methodology.

This study utilizes a conceptual framework adapted from the work of Zhu and Jin (2023). To better suit the specific context of Awash Bank, the original dependent variables, Bank Efficiency and ESG were refined. Corporate Governance Performance is substituted for ESG because ESG reporting in nascent in Ethiopia; Operational Efficiency replaces bank efficiency because it is more directly measurable in Ethiopian private banking context where financial performance data is limited. Specifically, the model was adjusted to focus on Operational Efficiency and Corporate Governance Performance. These modification paves the way for a more targeted analysis of how Bank Digital Transformation directly shapes the operational and governance outcomes within Awash Bank.

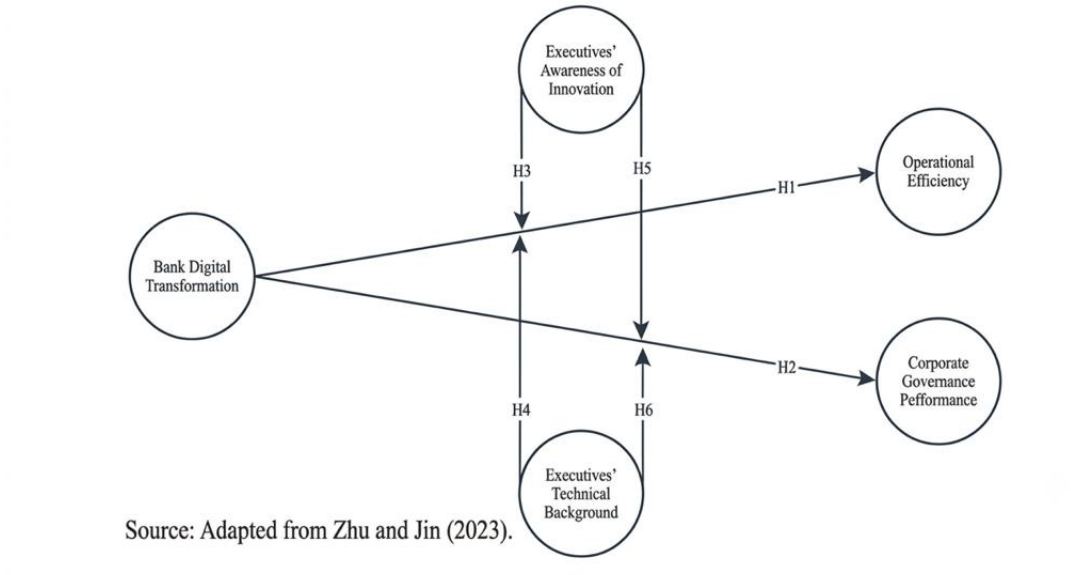


Figure 2. 1. Conceptual Framework of Study

As depicted in figure 2.1, BDT serves as the IV with direct to OE and CGP (H_1, H_2). EIA and ETB moderates these paths (H_3-H_6), meaning their presence strengthen or weakens the BDT outcome relationship.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter describes the procedures for data collection and analysis, along with the methodological decisions. The following sections are organized based on the research onion framework proposed by Saunders et al. (2019). The discussion begins with wide reflections of research philosophies, approaches and gradually progresses to detailed methods for data gathering and analysis.

3.1. Study Area Description

The study takes place in Addis Ababa city, the political and financial capital of Ethiopia. As the political, economic, and administrative hub of Ethiopia, Addis Ababa hosts a wide range of industries, financial institutions, and trade services. It is making an appropriate setting for studying digital transformation in the banking sector (Tadesse & Alemu, 2023).

Addis Ababa is home to several public and private banks, including Commercial Bank of Ethiopia, Development Bank of Ethiopia. In addition, there are various private commercial banks such as Awash Bank, Dashen Bank, Abyssinia Bank, and others (National Bank of Ethiopia, 2024). The existence of public and private financial institutions in Addis Ababa city provides a wide context for observing and examining banking sector innovations and transformations (Worku & Tilahun, 2022). This study solely focuses on Awash Bank which in the biggest private banks in all financial parameters. It is also one of the leading private banks in Ethiopia, which has its head office located in Addis Ababa Ethiopia. The bank has owning and managing many branches across the city, making Addis Ababa an ideal location for data collection. These study contributes important insights into how digital transformation initiatives are applied in a real world banking environment (Gebremariam, 2023).

3.2. Research Paradigm, Design and Approach

To effectively address the core research questions, this study, adopts a post-positivist paradigm, consistent with its quantitative, deductive, hypothesis-testing design (Creswell, 2018), acknowledging social phenomena can be measured while recognizing the fallibility of empirical observations.

3.2.1. Research Approach

This research used deductive quantitative approach and formulating hypotheses based on established theories (Tshitadi, 2024; Creswell & Creswell, 2018). To examine the relationship between different constructs, this study adopted a quantitative research methodology, more precisely a cross-sectional data collection to gather and analyze relevant data at one point in time. The cross-sectional design means data are collected for a specific period and cannot predict outcomes over time (Bryman, 2016). The study's findings would be analyzed using quantitative data, focusing on numerical measurements and statistical analyses (Hair et al., 2019). Quantitative approach is often preferred to quantify and evaluate the connections between the constructs being studied and hypothesis testing in business filed (Yadegaridehkordi et al., 2023; Saunders et al., 2019).

3.2.2. Research Design

This study uses an explanatory research design to how the independent variable bank digital transformation, influences the dependent variables, operational efficiency and corporate governance performance, while also considering the roles of two moderating factors executive innovation awareness and technical background (Creswell & Creswell, 2018). The study specifically employs a cross-sectional, survey -based explanatory design. Date are collected at single point in time from Awash Bank branches and head office allowing examination of BDT's effects on OE and CGP, conditional on executive characteristics. An explanatory design is appropriate the objective is to understand how one variable affects another and to test hypothesized relationships (Saunders et al., 2019).

3.3. Types and Sources of Data

For this study data were collected through quantitative methods. The questionnaires was developed by using Likert scales that assessed aspects like Digital Transformation efforts, Operational Efficiency, Corporate Governance results, executives' awareness of innovation, and their technical expertise (see Appendix I). Primary data came from validated surveys adapted from previous research and distributed to the study's sample group (Zikmund et al., 2020).

3.4. Sampling Design

3.4.1. Target Population and Sampling Frame

According to the NBE report, Ethiopia currently has around 32 licensed banks, including the state-owned CBE, approximately 28 private commercial banks, a development bank, and several interest free banks. Among private banks, this research focused on Awash Bank. Of the 20,900 total employees nationwide (Awash Bank Annual Report, 2024), approximately 3,952 are employed within Addis Ababa regional offices and headquarter constituting the sample frame.

3.4.2. Sample Size Determination

The sample size was calculated using the Bukhari technique, which is based on well-established methods like the Krejcie and Morgan (1970) approach, widely recognized in empirical studies. The Excel-based Bukhari calculator provides a simple method for determining the appropriate sample size from a population, ensuring statistical analysis accuracy (Bukhari, 2022). The Bukhari formula for a known population (Abdul & Bukhari, 2021) is presented below:

$$\text{Sample size} = \frac{\frac{z^2 \times p\,(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p\,(1-p)}{e^2 N}\right)}$$

Bukhari Sample Size Calculator (Abdul & Bukhari, 2021)

Confidence Level: 95%

Sample Proportion (p): 0.5

Margin of Error (e): 0.05

Population Size (N): 3952

Alpha divide by 2: 0.025

Z-Score (z): 1.96

Sample Size: 350

From the total population 350 employees included in the sample. According to Chapman et al. (2021), this number accurately represents the whole population. A questionnaire distributed to all sample employees based on proportional allocation within Awash Bank. The sample drawn explicitly from Addis Ababa, and the questionnaire administered at the head office, within various units, and across four city regional areas of Awash Bank.

3.4.3. Sampling Techniques and Procedure

The research employed systematic random sampling to select employees who were involved in different positions (Branch/Area Manager, Director, Executive), proportionally from the North Addis Ababa Region, South Addis Ababa Region, East Addis Ababa Region, West Addis Ababa Region and head quarter under the Awash Bank Addis Ababa City Regional Areas (Table 3.1.). This approach helped minimize bias and improved the overall validity of the research (Creswell & Creswell, 2018).

Table 3. 1. Sample Proportion by Regional Areas.

Awash Bank Addis Ababa City Regional Areas	**Branch population (N)**	**Proportion of population $P_i=\frac{Ni}{N}$ Total %**	**Sample distribution population $n_i = n*P_i$**
North Addis Ababa	793	20.1	70
South Addis Ababa	1,181	29.9	105
East Addis Ababa	843	21.3	75
West Addis Ababa	984	24.9	87
Head quarter staff	151	3.8	13
Total	**3,952**	**100**	**350**

Source: Field Data, 2026.

3.4.4. Data Collection Instruments

This study undertakes a well-structured questionnaire as the primary data collection instrument. The survey instrument was developed by operationalizing the construct of Zhu and Jin (2023). To ensure content validity, items were adapted from validated scales journals, mainly Vial (2019) for bank digital transformation, Shao (2021) for operational efficiency, and the rest from various top journals as emanated below. The complete questionnaire instrument is presented in Appendix I. As reliability and comparability are

important factors across all relevant observations, the questionnaires are widely used in empirical research within banking industry focusing on those at management level since it allows the researcher to systematically gather standardized information from large number of respondents. Google Forms were used to create the well-organized survey instrument, which was then sent via email to random systematically selected employees. In the context of bank digital transformation and corporate governance performance research, structured survey instruments are useful to incorporate perceptions, views, experiences, and executive assessment of structured organizational practices that are not merely observable through secondary data. Validated measurement items were taken from current literatures to develop to measure the latent constructs .

Bank Digital Transformation , Operational Efficiency, Corporate Governance Performance ,Executive Innovation of Awareness and Technical capacities are five main constructs employed for this study. Latent constructs been measured using six items, resulting a total of 30 measurement indicators. The whole items are rated using a five-point Likert scale ranging from 1: Strongly disagree to 5:Strongly agree, enabling for narrower responses and using Structural Equation Modeling to analyze robust data.

BDT construct measures the level to which digital technologies are intertwined and connected into operations, service delivery, and strategic planning in Awash Bank. The study presents an overview of the current banking landscape, highlights key technology trends and common challenges during implementation. The suggestion of this study many of the hurdlers are not technical but rather arise from organizational culture, and unclear strategic leadership. Perspectives insights from Muller (2023) on Corporate Governance in Bank Digital Transformation and Verhoef et al. (2023) were also well incorporated.

The Second construct operational efficiency mirrors how the bank utilizes its technological resources to enhance productivity and substantially reduce operational overhead costs. Reducing operational errors, improving service delivery time, advancing internal and external workflow efficiency and updated data processing tools are main components of digital technologies which often improves operational efficiency in a current dynamic banking environment. All questions have taken from Shao (2021) & Aysan et al. (2021) which the paper usually focuses investigating how digital tools connects back-end

operations while at the same time improving the end user journey. Other references like Gupta & George (2023); Alam et al., (2025) widely examined and thoroughly assessed in this regard.

For corporate governance the measurement items are derived from studies mainly investigating the relationship between digital technologies and governance mechanisms. All Six questions were derived from William et al. (2025) which explores how the process of digital transformation fundamentally alters existing corporate governance mechanisms. It posits the turn towards data driven decision making and the automation of regulatory compliance. This item assesses how bank digital transformation advance transparency, regulatory compliance, accountability and monitoring within organization. Li and Lou (2024) and Nahum (2025), focusing on the intersection of ownership structures and the Board of Directors influence on digital change. Bank Digital Transformation and corporate governance envisaged detail view which most of questionaries were adopted for this variable.

The construct Executives' awareness of innovation is measured using items adapted from leadership and innovation and management literatures, which assesses the extent to which senior executives recognize the strategic importance of innovation and support the adoption of new technologies within organization. Warner and Wager (2023) Building capabilities for bank digital transformation stressed on leadership awareness and support for innovation are important factors influencing the success of bank digital transformation initiatives in organizations (Abbes, 2025). Consequently, Hambrick & Mason (1984) & Carpenter (2004) which adopts contingency approach, arguing that the ideal digital leader is not a one size fits all profile were used as input while developing the measurement instruments. It envisages how leaders must adapt to their awareness and innovative tactics based on the organization context and dynamic technological environment. Based on Abbes (2025), strategic pathways for innovation and sustainability in bank digital transformation that were also a place where the researcher drives relevant questionaries which excavates bank digital transformation has become a strategic pathway through which organizations enhance innovation capacity and achieve sustainable competitive advantage in rapidly evolving business environments.

The measurements for executives technical background latent construct were derived from Zhang (2024), who explores how executives with overseas education or work experience affect a company's digital transformation. The idea is that returnees convey diverse ways of thinking perspectives, global networks, and a greater appetite to take calculated risks associated with advanced technological dynamism. These factors assess the level of technological knowledge and technical expertise among senior managers. Some literature is emerging and being used in studies such as Zhang's (2024) study to strengthen the validity of the questionnaire, and the role of executives' overseas backgrounds in enterprise banking digital transformation (Benitez, Ray, & Henseler, 2023).

3.5. Methods of Data Analysis

A quantitative data analysis method was employed to examine the relationships between Bank Digital Transformation, Operational Effciency, Corporate Governance Performance, and the moderator variables (Executives' Innovation Awareness and Technical Background).

3.5.1. Methods of Quantitative Data Analysis Techniques

This study employes Partial Least Squares structural equation modeling to analyze the data, employing Smart PLS (version 4) as the statistical tool. PLS-SEM was selected for three basic reasons. First, it is well suited for analyzing complex research models involving various constructs, indicators and moderating relationships. Second, it is prediction oriented, making it very useful for studies that require to explain and predict organizational outcomes rather than solely test established theories. Third, unlike covariance-based SEM, PLS -SEM does not need data to meet strict normality assumptions, making it suitable for social science research where data distribution are non-normal (Chin, 2009). It incorporates data exploration, theory testing and measurement model assessment. These progressive features presents an opportunity for rigorous testing of the hypothesized relationships, including the moderating roles of executive innovation awareness and technical background in the relationship between bank digital transformation and organizational outcomes (Ringle et al., 2022). The selection of PLS-SEM is informed by the characteristics of the data, including the sample size and its capability to handle complex

models with moderating effects. This approach has become increasingly very popular in research on business management and related fields (Iqbal et al., 2021).

PLS-SEM is a method focuses on components to forecast cause-effect linkages in route models with latent variables, as recommended by Karnadi (2023). Unlike covariance-based techniques (CB-SEM), PLS-SEM is recognized a second-generation multivariate data analysis technique within the structural equation modeling framework. It is particularly suitable for exploratory research, prediction-oriented studies, and models with complex moderating structures (Hair et al., 2019).

Common Method Variance (CMV) Assessment

Self-administered questionaries were completed by Awash Bank employees during data gathering at one point in time which creates the possibility of the Common Method Variance (CMV). Based on Podsakoff et al. (2003), CMV may cause either an overestimation or underestimation of the relationships between variables when the same individual reports on both independent and dependent variables. To minimize the occurrence of CMV, procedural measures for assessing and controlling CMV were applied throughout the data collection process.

3.5.2. Model Specification

Before SEM analysis, model assumption tests were conducted. The SEM framework integrated latent variables unobserved constructs and observed indicators through a measurement model and structural model (Hair et al., 2019).

A reflective specification is adopted because items are conceptualized as interchangeable manifestation of the underlying latent trial and exhibit high inter-item correlations (Hair et al., 2021).

Measurement Model

For this study comprises five latent variables, each measured by a set of observed indicators derived from the questionnaire. The first variable, bank digital transformation, includes six indicators that evaluate how digital technology is integrated, processes are streamlined, the

transition from traditional to digital platforms, and the presence of a dedicated digital innovation team. These indicators were adapted from previous studies by Vial (2019) and Li et al. (2021), with some minor changes, and also incorporated insights from Muller (2023) and Verhoef et al. (2023). Indicators reflecting leadership digital thinking, employee innovation, and proactive change management were captured by executive innovation awareness variable. Items were adapted from works by Hambrick and Mason (1984), Carpenter (2004), Warner and Wager (2023), and Abes (2025).

Executives' technical background was measured through indicators emphasizing technical skills such as data analysis and programming, international or academic experience, a blend of competencies, and the ability to make informed technological decisions. These indicators are developed based on Zhang (2024) and further informed by Benitez et al., (2023). Operational efficiency variables was used indicators related to competitiveness in the market, overall efficiency improvements, reduction of operational risks and human errors, lower operating costs, and enhanced employee productivity. These items draw from studies by Shao (2021); Aysan et al. (2021); Gupta and George (2023); Alam et al., (2025).

The fifth variable corporate governance performance is assessed using indicators that deal with real time monitoring, automated compliance, data-driven decision-making, board oversight, communication with regulators, accountability, transparency, and creating untameable audit trails. These indicators are taken from Nahum (2025); William et al. (2025); Li and Lou (2024).

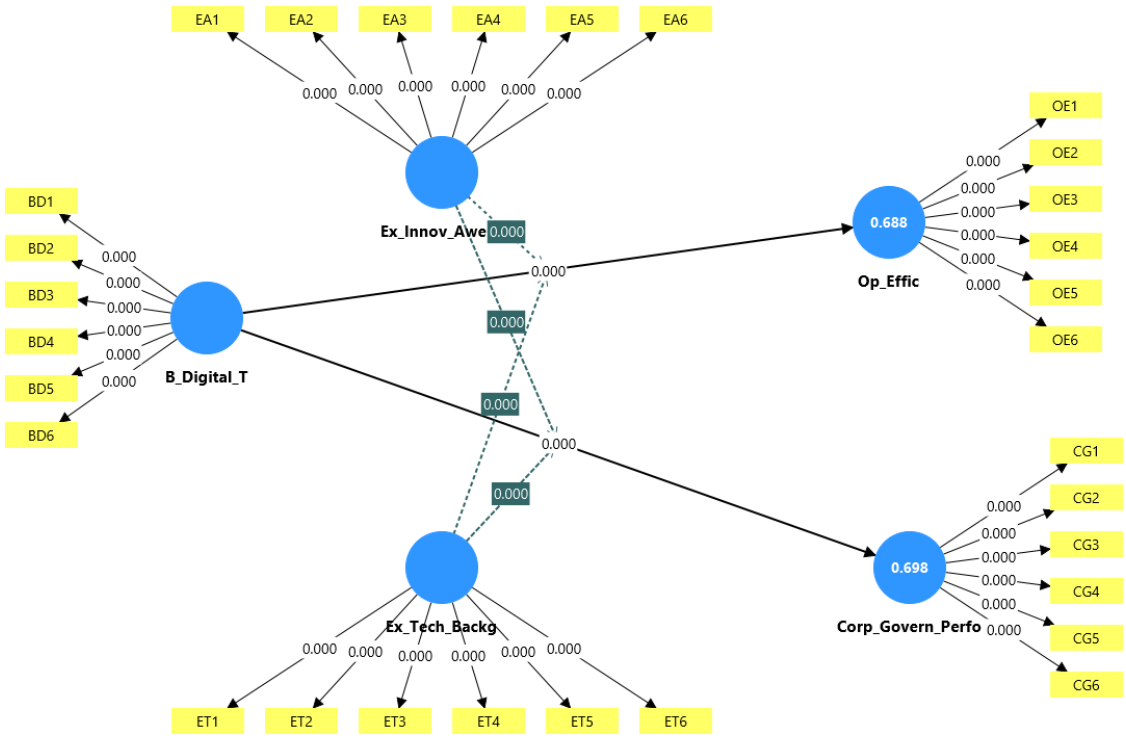


Figure 3. 1. Measurement Model

Source: Researcher 2026, Analysed in SmartPLS (Version 4.1.1.8)

3.5.3. Data Validity and Reliability

Validity was ensured through content validity and convergent validity. Based on Creswell and Creswell (2018), the research instruments survey items were pre tested with a pilot sample comprising bank managers and directors of Awash Bank to identify and resolve any unclear questions. This pilot involved 30 participants representing approximately 10% of the total sample of 350 was conducted to assess the content validity of the questionnaire. The purpose was to assess the clarity, relevance, and comprehensiveness of the questions in capturing the relationship between key variables.

Responses to Likert-scale questions (1: very low to 5: very high) showed that over 83% of participants rated the items as “high” or “very high”, indicating that the questions were effective. There was strong agreement across 81.2% of responses, supporting the idea that pilot studies should focus on aspects of validity that are clear rather than testing hypotheses (Lyon et al., 2011). Slight wording issues was identified and instantly corrected to improve clarity, ensuring that the questionnaire successfully captured the intended variables. All

latent constructs confirmed convergent validity, as all constructs had AVEs above the recommended threshold of 0.50 (Hair et al., 2019).

Reliability

To evaluate the reliability of the measurement, model several indicators were analysed. First, internal consistency among the items within each variable was assessed using Cronbach's alpha (α). The results demonstrates that all variables meet the acceptable threshold of 0.70 in line with criteria established by Hair et al. (2019). Additionally all composite reliability (rho_c) values exceed the recommended threshold of 0.70, which is well above 0.90, indicating strong internal consistency. Consequently the measurement model deemed reliable and suitable for further analysis, and no variables need to be removed due to reliability concerns.

3.5.4. Structural Model

According to Schumacker and Lomax (2020), a structural model shows the relationship between different variables. In this study, the independent variable is bank digital transformation. This variables has a directly effect on both operational efficiency and corporate governance performance. However, the model goes beyond simple direct effects. It also examines how executive innovation awareness and technical background moderate these relationships. These traits of moderation can strengthen or weaken the impact of digital transformation. The study tested six main hypotheses. All relationships examined using bootstrapping with 5,000 subsamples. Path significance was determined using t-statistics and p-values, with a cutoff $p < 0.05$ indicating statistical significance (Hair et al., 2021).

Moreover, the moderation effects simple slope analysis was conducted to analyse the moderation effect. This method follows the recommendations of Aiken and West (2021) and Hayes (2022). Below is the Simple Slope formula ,

Slope = ***b(BD) + b (Moderator * BD) * Moderator Value***

In this formula,

- b(BD) is the main effect of digital transformation.
- b(Moderator × BD) is the interaction effect between the moderator and IV.
- Moderator values are set at (low = -1), (average = 0), and (high = +1).

Simple Slope Analysis demonstrates how the effect of Digital Transformation changes depending on executive traits. These questions exhibited result by examining slopes at different moderator levels. To sum up, these approaches offer a complete picture of how executive characteristics shape the success of digital transformation at Awash Banks in Addis Ababa.

3.5.5. Operationalization and Definition of Variables

Bank digital transformation refers to how deeply a bank integrates digital technologies into its everyday transactional operations, service delivery, and strategic processes (Vial, 2019; Gong & Ribiere, 2021). This reflects the degree to which technology is integrated into banking operations, whether processes have been streamlined, and the extent to which traditional platforms have shifted to digital ones.

Executive innovation awareness captures the degree to which senior leaders truly recognize that innovation matters strategically and actively support the adoption of new technologies within their organization (Hameed, Nisar, & Wu, 2022). This is reflected by leadership has a genuine digital mindset, strategic discussions to address technological change, and leaders actively manage change (Schumacher & Gentsch, 2022).

Executive technical background measures the level of technological knowledge and hands-on technical expertise among senior executives (Helfat & Peteraf, 2015). This include executive's technical skills such as data analysis, and well-informed technological decisions (Zhang, 2024).

Operational efficiency reflects how well a bank uses its technological resources to boost productivity and cut down on operational overhead (Shao, 2021). This includes reducing operational errors, improving service delivery times, advancing workflow efficiency, and using recent data processing tools (Gupta & George, 2023). It used indicators like market

competitiveness, reduction in operational risk, and decreased operating expenses (Alam et al., 2025).

Corporate governance performance assesses how effectivelly digital transformation promote transparency, regulatory compliance, accountability, and internal monitoring within the bank (Alsayegh, Rahman, & Mahmud, 2020; Muller, 2023). This is demonstrated by data-driven decision-making processes, and the quality of board oversight, effectiveness of regulatory communication, accountability mechanisms, transparency in operations, (Ghertescu, Mihaila, & Ghițu, 2024).

3.5.6. Ethical Consideration

The research followed ethical guidelines to protect the rights and privacy of participants. This included ensuring confidentiality, obtaining informed consent, and allowing participants to withdraw without consequences (Orb et al., 2001). Participants were fully informed about the study objectives and their personal information was kept confidential. Data were stored securely and participants' names were not used in reports or publications. The researcher took steps to prevent any harm to participants in the research process.

CHAPTER FOUR
RESULTS AND DISCUSSION

This chapter summarizes the research findings from a survey of branch managers, directors, CEOs, and board members in Addis Ababa. It examines how digital transformation in banks affects operational efficiency and corporate governance performance. The chapter begins with a description of the response rates of the research instruments, followed by an analysis of their background characteristics of the participants. Then followed by a clear and consistent presentation, interpretation, and discussion of the results.

4.1. Descriptive Analysis: Background Information

This section shows the descriptive analysis of background characteristics of study participants. It is important to describe the demographic characteristics of the respondents in order to interpret and examine their experiences and perceptions about a project. The analysis includes the variables like gender, age group, educational status, designation and work experience in Awash Bank. These parameters of the sample that give an overall picture which help interpret the findings in greater depth.

4.1.1. Response Rate and Data Cleaning

The survey conducted in Awash Bank received very high response rates and indicating strong involvement from the target population. Three hundred fifty questionnaires distributed to Head quarterstaff, North, South, East and West Addis Ababa regional areas. Among these 345 responses were accepted and five response excluded due to identical responses on all indicators. These were an indication of inattentiveness or response bias as per the preregistered exclusion criteria for datasets with a standard deviation less than 0.25 (Meade & Craig, 2012), yielding a 99% completion rate. This high response rate reflects effectiveness of the digital delivery method, automated reminders and management support. The study's response rate significantly exceeded the benchmarks confirming reliable quantitative data. Therefore, this high participation underlines the active

participation of employees across all regional areas reinforcing the validity of the findings (Table 4.1).

Table 4. 1. Response and Accepted Rates

Awash Bank Addis Ababa City Regional Areas	Distributed	Returned and Accepted	Rate in percent
North Addis Ababa	70	69	99%
South Addis Ababa	104	102	98%
East Addis Ababa	75	74	99%
West Addis Ababa	88	87	99%
Head quarter staff	13	13	100%
Total	350	345	99%

Source: Field survey data (2026).

Outliers Detection

An outlier is a data point in a dataset that meaningfully deviates from other data. Outliers can negatively impact research by introducing bias or statistical analysis errors. This is leading to misleading conclusions (Zikmund, 2002). Using statistical diagnostic tools is a standard technique for locating outliers. Google Forms were used as survey instrument to collect the data. No outliers were detected in the dataset of this study. Multivariate outliers were assessed using Mahalanobis distance calculated via linear regression in SPSS. The chi-square critical value at $p < 0.001$ is 20.515. The maximum Mahalanobis distance in the dataset was 20.123 (Appendix II), which does not exceed this threshold. Cook's distance values ranged from 0.000 to 0.091 and the result shows below 1.0 (Tabachnick & Fidell, 2019). Therefore, no multivariate outliers were detected and all 345 cases were retained for analysis.

4.1.2. Demographic and Socioeconomic Characteristics

The respondents of the survey have diverse demographic and socioeconomic profiles. Key characteristics including age, gender, educational attainment, designation, and work experience are summarized using figures and tables. This provides valuable understanding

of the target population on their operational efficiency and corporate governance performance within the context of Awash Bank in Addis Ababa.

Table 4. 2. Background Characteristics of Respondents

Characteristics	Category	Frequency	Percent
Gender	Male	254	73.6
	Female	91	26.4
	Total	345	100.
Age	15-25	4	1.2
	26-35	168	48.7
	36-45	161	46.7
	46 and above	12	3.5
Education	Diploma	2	0.6
	Bachelor Degree	86	24.9
	Master Degree	255	73.9
	PhD	2	0.6
Designation	Branch/Area Manager	331	95.9
	Director	5	1.4
	Executive	7	2.0
	Chief Executive Officer (CEO)	1	0.3
	Member of Board of Directors	1	0.3
Work Experience	< 2 years	1	0.3
	2 - 5 years	20	5.8
	6 - 10 years	122	35.4
	> 10 years	202	58.6

Source: Field survey data (2026).

Based on Table 4.2, the demographic profile of respondents is highly skewed toward experienced, mid-level managers. Regarding gender the sample was predominantly male, with 73.6% of participant identifying as male and 26.4% as female. The age range was

mostly young to middle-aged, mainly between 26 and 45 years, making up over 95% of the participants. Regards to education 73% possess master degree, 25% hold bachelor degree advanced degrees, holds and only a small proportion 1.2% combined have a diploma or PhD.

For position, almost all respondents 95.9% were branch or area managers. While senior leaders filled just 4.1% of the sample. More than half having over 10 years of experience. Therefore, respondents were experienced, middle career branch or area manager, around 26 to 45 year's old and holding at least a master's degree. This shows survey data for operational efficiency and governance come from knowledgeable and mid level professionals.

4.2. Descriptive Analysis; Key Variables

Key variables of this study like bank digital transformation, executive innovation awareness, executive technical background, operational efficiency, and corporate governance performance were explored. Data collected using Likert scale of five point from 1 for strongly disagree to 5 for strongly agree. Low mean scores considered as 1.0–2.4, moderate with 2.5–3.4, or high score with 3.5–5.0 based on Likert scale interpretation (Jebb et al., 2021). The study used SPSS software to calculate frequencies, means, and standard deviations and the results presented in tables & each item discussed in detail.

Table 4. 3. Standard deviations and means of items

constructs	items	number	mean	St. dev.
Bank Digital Transformation	BDT1	345	3.13	0.77
	BDT2	345	3.01	0.73
	BDT3	345	3.04	0.75
	BDT4	345	2.88	0.75
	BDT5	345	2.75	0.79
	BDT6	345	3.11	0.75
Executive Innovation Awareness	EIA1	345	3.19	0.65
	EIA2	345	2.98	0.76

constructs	items	number	mean	St. dev.
	EIA3	345	3.23	0.71
	EIA4	345	3.29	0.76
	EIA5	345	2.84	0.79
	EIA6	345	2.92	0.77
Executive Technical Background	ETB1	345	3.09	0.79
	ETB2	345	2.91	0.84
	ETB3	345	3.11	0.75
	ETB4	345	3.11	0.89
	ETB5	345	2.83	0.75
	ETB6	345	2.92	0.78
Operational Efficiency	OE1	345	2.21	0.67
	OE2	345	2.40	0.78
	OE3	345	2.22	0.64
	OE4	345	2.42	0.76
	OE5	345	2.26	0.63
	OE6	345	2.27	0.68
Corporate Governance Performance	CGP1	345	2.12	0.57
	CGP2	345	2.38	0.60
	CGP3	345	2.03	0.54
	CGP4	345	2.10	0.62
	CGP5	345	2.20	0.65
	CGP6	345	2.05	0.63

Source: Field Data, 2026, calculated with SPSS v.27

The mean scores in Table 4.3, for all items across the five constructs range from 2.03 to 3.29. The standard deviations fall between 0.54 and 0.89. This indicates average respondents tended to agree neutral toward the statements presented. All means fall within the moderate category from 2.5 to 3.4. Specifically, bank digital transformation mean

scores recorded between 2.75 to 3.13 and standard deviations around 0.73–0.79. This is suggesting relatively consistent but moderate agreement.

Executive innovation awareness showed slightly higher means. It ranges from 2.84 to 3.29. Executive technical background showed means between 2.83 and 3.11 and the standard deviations 0.75 to 0.89. This reflects the reasonable level of respondent consensus. Operational efficiency recorded means from 2.21 to 2.42 and standard deviations between 0.63 and 0.78. These showed greater variability in how respondents viewed efficiency related statements. The corporate governance performance mean result showed between 2.03 and 2.38 with standard deviations within 0.54 to 0.65. This indicates slightly lower agreement levels. Somewhat, the respondents generally had a positive view of all aspects studied, their feeling most aligned around executive technical characteristics.

4.3. Inferential Analysis: Model Validation

The inferential analysis is employed measurement model to validate and test hypotheses. Partial least squares structural equation modelling is frequently used to test the relationship between one or more exogenous and endogenous variables (Tseghur et al., 2021). In general, this approach assesses how well the hypothesized variables fit the observed data (Wong, 2013). In specific the measurement model captures the predictive relation between latent variables and observable indicator. SmartPLS offers particular advantages when testing complex interactions involving multiple dimensions.

PLS-SEM provides a robust valuation of a model's predictive power and helps determine the overall quality of the research model (Hair et al., 2021). Typically, measurement models evaluate all item construct relationships simultaneously (Hair et al., 2021). Based on Chin (2009), PLS-SEM does not require normality assumptions, as it is more adept at handling both linear and nonlinear relationships. Furthermore, Hair et al. (2021) note that PLS-SEM is particularly suited for addressing issues related to formative and reflective components, as well as the connections between study constructs.

4.3.1. Measurement model assessment

When assessing measurement models, it is essential to examine both formative and reflective constructs from the beginning. In reflective constructs, the assumption is that the latent construct influences its indicator items, meaning the items reflect the underlying latent construct. Consequently, relationships visualized as arrows pointing from the latent variable to its indicators. In contrast, when the latent construct caused by its indicators rather than being reflected by them, the model is considered formative (Hair et al., 2021). In such cases, a change in an indicator leads to a change in the latent construct. This research employs a reflective measurement model, assuming that each construct influences its indicator items.

4.3.1.1. Reliability assessment

The valuation of internal consistency reliability represents the foundational step in evaluating a reflective measurement model. This ensures that the set of indicators measuring a given construct operates in a coherent and dependable manner. As presented in the Table 4.4, all constructs bank digital transactions, executive innovation awareness, executive technical background, and governance performance, and operational efficiency exhibit strong reliability indicators. The evaluation employs three distinct coefficients, Cronbach's alpha, composite reliability (rho_a & rho_c). Moreover, convergent validity is assessed through the AVE. Together, these metrics confirm that the measurement model meets the required psychometric standards for further structural analysis. (Hair et al., 2021).

Table 4. 4. Reliability Assessment

	Cronbach's alpha	**Composite reliability (rho_a)**	**Composite reliability (rho_c)**
Bank Digital Transformation	0.931	0.932	0.945
Executive Innovation Awareness	0.923	0.924	0.940
Executive Technical Background	0.923	0.924	0.940

Corporate Governance Performance	0.921	0.924	0.938
Operational Efficiency	0.936	0.937	0.950
Accepted Thresholds	**> 0.70**	**> 0.70**	**> 0.70**

Source: Survey data (2026).

Based on Table 4.4. Cronbach's alpha used to measure of internal consistency reliability, which measures how reliable a set of observed variables is. It is calculated based on the correlation between all indicators in a construct and ranges from 0 to 1. The values ranged from 0.931 to 0.936, with a remarkable value. Like, executive technical background scored 0.923 and operational efficiency scored 0.936, both exceeding the generally recommended cutoff of 0.70 (Hair et al., 2021). This confirms that all constructs have strong internal consistency based on Cronbach's alpha.

Composite reliability (rho_a) provides alternative measure of internal consistency that does not show equal indicator loadings. Unlike Cronbach's alpha, Rho_a is calculated using factor loadings and measurement errors, it is more appropriate for PLS-SEM. The table shows rho_a values ranging from 0.924 to 0.937 for the five constructs. Executive technical background shows a 0.924, while operational efficiency 0.937. All values exceed the acceptable threshold of 0.70 (Henseler et al., 2016). Furthermore, rho_a typically falls between Cronbach's alpha and rho_c, which is consistent with the findings. Overall, these results reinforce the strong internal consistency of our constructs using this alternative reliability measure.

Composite reliability (rho_c), referred to as composite reliability. It is another strong measure of internal consistency that prioritizes indicator loadings that are weighted by their respective errors. Table 4.4 presents rho_c values for all constructs between 0.938 and 0.950. Executive technical background records the lowest rho_c at 0.940, while operational efficiency records the highest at 0.950. Each value exceeds the suggested threshold of 0.70 (Hair et al., 2021). Particularly, rho_c consistently produces higher values than Cronbach's

alpha. Thus, internal consistency reliability is strongly confirmed through rho_c across the measurement model.

4.3.1.2. Reliability Assessment: Indicators Reliability

The study examined indicator reliability to determine whether each individual measurement item adequately represents its intended latent construct. Indicator reliability is measured by examining the outer loadings of each observed variables on its respective construct (Hair et al., 2021). High outer loadings indicate that a substantial portion of the item's variance is explained by the underlying construct, thereby demonstrating shared variance among correlated indicators (Henseler et al., 2016). Based on Hair et al. (2021), a minimum threshold of 0.708 is recommended because it implies that the construct explains more than 50% of the indicator's variance.

Table 4. 5. Outer loadings

	Bank Digital Transformation	Executive Innovation Awareness	Executive Technical Background	Corporate Governance Performance	Operational Efficiency
BDT1	0.869				
BDT2	0.876				
BDT3	0.862				
BDT4	0.867				
BDT5	0.842				
BDT6	0.856				
EIA1		0.825			
EIA2		0.852			
EIA3		0.840			
EIA4		0.869			
EIA5		0.864			
EIA6		0.847			
ETB1			0.839		
ETB2			0.845		
ETB3			0.846		
ETB4			0.870		
ETB5			0.845		
ETB6			0.856		

	Bank Digital Transformation	Executive Innovation Awareness	Executive Technical Background	Corporate Governance Performance	Operational Efficiency
CGP1				0.837	
CGP2				0.873	
CGP3				0.837	
CGP4				0.833	
CGP5				0.865	
CGP6				0.836	
OE1					0.894
OE2					0.878
OE3					0.872
OE4					0.853
OE5					0.852
OE6					0.877

Source: Field survey data (2026).

Table 4.5 displays the outer loadings of all measurement items with their particular latent variables. According to Hair et al., (2011), outer loadings should be 0.708 or higher to confirm adequate indicator reliability. For bank digital transformation, all six items exhibit loading range from 0.842 to 0.876, well above the 0.708 threshold. This is indicating that each BDT item strongly shares variance with the construct and confirming excellent indicator reliability. Regarding executive innovation awareness loadings range from 0.825 to 0.869. It exceeds 0.708, thus all six items demonstrate acceptable indicator reliability (Henseler et al., 2016).

For executive technical background, loadings range between 0.839 and 0.870. The result showed above the 0.708 benchmark, indicating that each ETB item reliably reflects the underlying construct (Bagozzi & Yi, 1988). Corporate governance performance shows very high loadings ranging from 0.833 to 0.873, all significantly above 0.708. It indicated that the construct accounts for more than 75% of the variance of each indicator and reflects strong indicator reliability. Similarly, operational efficiency presents loadings ranging from 0.852 to 0.894, all above the 0.708 threshold. It indicated that each OE item is highly representative of the operational efficiency construct (Hair et al., 2021). Together, all 30

items in the five constructs meet or exceed the loading threshold of 0.708. This is establishing solid indicator reliability and providing a trustworthy foundation for subsequent validity and structural analyses.

4.3.1.3.Validity Assessment: Convergent Validity

Convergent validity is a critical component of reflective measurement model assessment, which ensures that indicators of a particular construct share a significant amount of common variance. This validity is empirically verified using AVE and measures the extent to which a latent construct explains the variance of the indicators relative to measurement error. As shown in Table 4.6, AVE values for all five constructs are reported at acceptable thresholds. According to Hair et al. (2019), an AVE value greater than 0.50 indicates that the construct accounts for more than half of the variance in the indicators.

Table 4. 6. Convergent Validity: Average variance extracted

Variables	AVE	Accepted Thresholds	Results
Bank Digital Transformation	0.743	> 0.50	acceptable
Executive Innovation Awareness	0.722	> 0.50	acceptable
Executive Technical Background	0.723	> 0.50	acceptable
Corporate Governance Performance	0.718	> 0.50	acceptable
Operational Efficiency	0.758	> 0.50	acceptable

Source: Survey data (2026).

Table 4.6 shows the AVE values for all five constructs when the mean square of the construct related indicators is loaded, and a reference value of 0.50 or higher is required to ensure robust validity. Hair et al. (2019) showed that an AVE above 0.50 indicates that the construct explains more than half of the variance in the indicators and less than half is due to measurement error. Bank digital transformation records an AVE of 0.743, which is above the 0.50 threshold. This indicated that 74.3% of the variance in the indicator is accounted

for by the construct. Executive Innovation Awareness achieved an AVE of 0.722, also above the benchmark and confirming acceptable convergent validity (Hair et al., 2019).

Executive technical background reported an AVE of 0.723, which exceeded 0.50. it indicated that the construct explains 72.3% of the variance in the six items. Corporate governance performance shows a strong AVE of 0.718, indicating that nearly 71.8% of the respondent's variance is shared by the construct. Operational efficiency records the highest AVE at 0.758, indicating excellent convergent validity. Therefore, since all AVE values are above the recommended threshold of 0.50, convergent validity is fully confirmed for each construct in the reflective measurement model (Henseler, Ringle, & Sarstedt, 2016).

4.3.1.4. Validity Assessment in discriminant validity

Discriminant validity, another important test looks at how well each construct is distinct from the others. It ensures that different constructs measure unique concepts without excessive overlap. This means the correlation between measures of different constructs should be low enough to confirm each construct's uniqueness, an idea supported by Hair et al. (2021) and Chin (2009). Traditionally, discriminant validity is assessed using the Fornell-Larcker criterion. However, some researchers have questioned the effectiveness of the Fornell-Larcker approach, leading Henseler et al. (2016) to recommend the Heterotrait-Monotrait (HTMT) ratio of correlations as a more robust alternative. The recommended threshold for establishing discriminant validity using HTMT is < 0.90 (Henseler et al., 2016).

Table 4. 7. Analysis of Discriminant Validity (HTMT)

	Bank Digital Transformation	Exec. Inov Awareness	Exec. Tech Background	Corporate Governance Performance	Operational Efficiency
Bank Digital Transformation					
Exec. Inov Awareness	0.657				
Exec. Tech Background	0.671	0.746			

Corporate Governance Performance	0.605	0.665	0.640		
Operational Efficiency	0.612	0.639	0.652	0.744	

Source: Field survey data (2026).

Table 4.7 presented that HTMT results between all pairs of constructs range from 0.605 to 0.746. Specifically, the highest HTMT value is 0.744 between corporate governance performance and operational efficiency, while the lowest is 0.605 between corporate governance performance & bank digital transformation. All HTMT values fall below the acceptable threshold of 0.90 (Henseler et al., 2016). Therefore, discriminant validity is satisfactorily confirmed for all latent constructs in the measurement model.

4.3.2. Evaluation of structural model

Afterward the confirmation of construct validity and reliability the next phase encompasses evaluating the structural model, which enables the testing of hypothesized relations between latent variables (Chin, 2009; Wong, 2013).

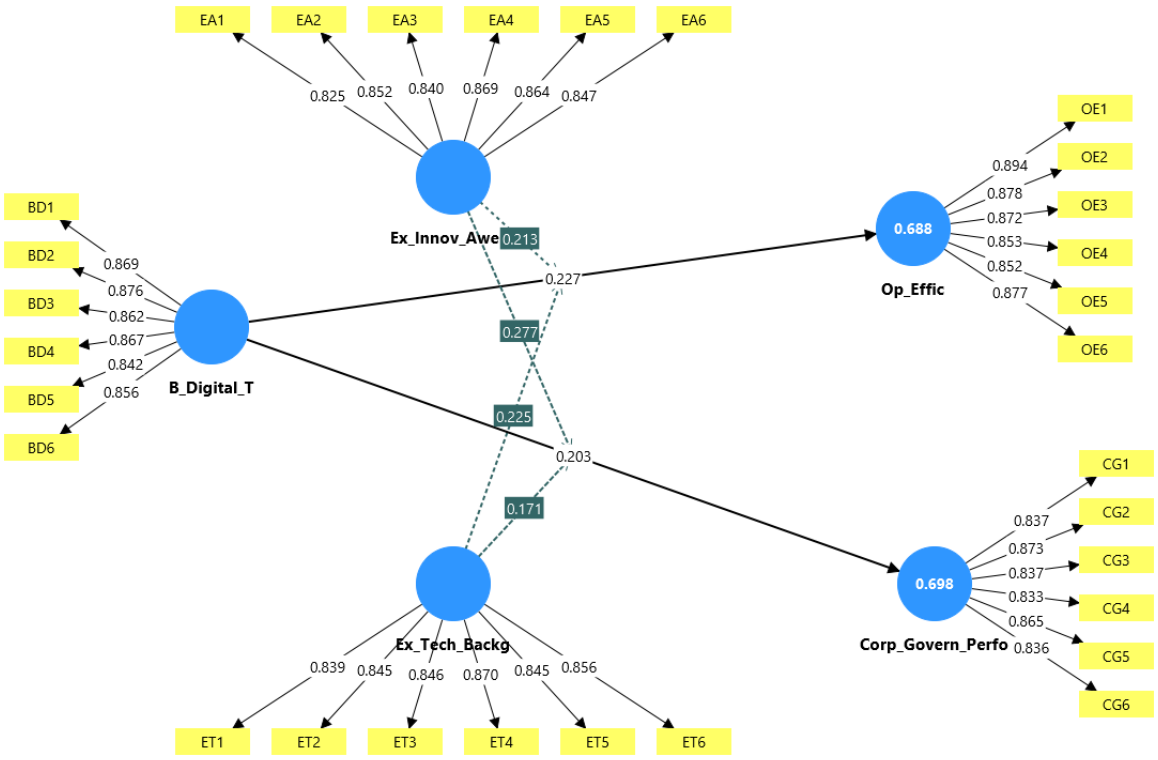


Figure 4. 1. Research Structural Model

Source: Researcher 2026, Analysed in SmartPLS (Version 4.1.1.8)

The structural model presented in Figure 4.1 consists of one exogenous construct, bank digital transformation, which serves as the independent variable, and two endogenous constructs, operational efficiency and corporate governance performance, as dependent variables. Two moderating constructs, executive innovation awareness & executive technical background, are included to explore their roles in the relationships. The model suggests that bank digital transformation has a direct impact on both operational efficiency & corporate governance performance. It is also indirect effects through the moderator of executive innovation awareness & executive technical background.

The evaluation of this model aims to test hypotheses, determine explanatory power (R^2), measure predictive relevance (Q^2), and analyse the significance and magnitude of path coefficients among constructs. The study utilizes PLS-SEM which does not support traditional goodness-of-fit tests but instead relies on non-parametric methods. PLS-SEM evaluates model quality using R^2 for the overall structural model and Average Variance Extracted (AVE) for measurement quality, along with effect sizes (f^2) to gauge the influence of predictor variables on outcomes (Hair et al., 2021).

Table 4. 8. Evaluation Criteria of the structural model

Criterion	Description	Acceptable fit
(R^2)	The coefficient quantify the degree of independent variables which account for the variance in dependent variables (Hair et al., 2021).	R^2 values (0.67) categorized as large. (0.33) for moderate, and weak (0.19) (Chin, 2009).
(Q^2)	The coefficient evaluates the model's ability to predict outcomes through sample (Hair et al., 2021).	Q^2 values00200.02 for weak, 0.15 for medium, and 0.35 for high predictive relevance (Cohen, 2013; Chin, 1998).
(f^2)	The extent of improvement in prediction achieved by fitting the model (Hair et al., 2021).	Similar to the concept predictive relevance.

4.3.3. Correlation Analysis

To assess the association and relations between variables a Pearson's correlation analysis was conducted to estimate the relations between variables (Field, 2018).

Table 4. 9. Correlations Matrix

	Bank Digital Transformation	Executive Awareness	Executive Background	Governance Performance	Operational Efficiency
Bank Digital Transformation	1				
Executive Innovation Awareness	.609**	1			
Executive Technical Background	.621**	.690**	1		
Corporate Governance Performance	.561**	.614**	.590**	1	
Operational Efficiency	.572**	.596**	.605**	.691**	1

Source: Survey data (2026).

As shown in Table 4.9, Pearson's correlation analysis examining relationships between bank digital transformation and four other variables. Results show moderate to strong positive and statistically significant correlations (all $r > 0.5$, $p < 0.01$). Operational efficiency ($r = 0.572$) and corporate governance performance ($r = 0.561$) have moderate to strong positive correlations with digital transformation. Executive innovation awareness ($r = 0.609$) and executive technical background ($r = 0.621$) also show strong associations. The strongest overall correlation is between corporate governance performance and operational efficiency ($r = 0.691$), indicating that good governance enhances efficiency (Hair et al., 2021).

4.3.4. Collinearity and Common Method Variance Assessment

The research employs the VIF since the structural model's collinearity assessment is the same as for reflective models (Hair et al., 2021).

Table 4. 10. Collinearity Statistics (VIF)-Inner model

Constructs	Sig.	Tolerance	VIF
Bank Digital Transformation	.000	.552	1.811
Executive Innovation Awareness	.000	.471	2.123
Executive Technical Background	.000	.460	2.174

Source: Survey data (2026).

As shown in Table 4.10, all VIF values for the inner model indicators are well below the common threshold of 5, and most are even below the more conservative threshold of 3, indicating that collinearity is not a major concern in this structural model. Bank digital transformation VIF value 1.811, executive innovation awareness shows slightly higher VIF value 2.123 and executive technical background VIF value 2.174, all within acceptable range below 5. This suggests very low collinearity (Hair et al., 2021). Thus, the VIF results confirm that those correlations do not produce problematic collinearity in the inner model. On top of assessing collinearity, the VIF values also serve as a diagnostic implicatory for common method variance (CMV). As per Kock (2015), when all VIF values in a model are below 3.3 it suggests that common method bias is not a significant concern. As the result depicts all VIF values in this study (ranging from 1.811 to 2.174) are below the 3.3 threshold it provides evidence that Common Method Variance does not significantly affect the structural relationships (Kock, 2015).

Though, to further strengthen the assessment of CMV extra tests were takes place. Inline with Podsakoff et al. (2003), Harman's single factor test was performed, where all 30 measurement items were entered into an exploratory factor analysis. The 1st factor exhibited for 49% of the total variance, which is below the recommended threshold of 50%, indicating that a single factor does not account for the majority of covariance among the variables. In addition, a common latent factor was added to the measurement model (Podsakoff et al., 2003; Tehseen et al., 2017). Comparison of standardized regression weights between the model with and without the common latent factors showed differences ranging from 0.011 to 0.017, all far below the threshold of 0.200, confirming that common method bias is not a significant threat to the validity of the findings. These five factors with eigenvalues greater than 1.0 were extracted, corresponding to the five theoretical constructs

BDT, EIA, ETB, OE, and CGP. These five factors collectively explained 73.65% of the total variance, exceeding the recommended 60% threshold (Hair et al., 2021). Pattern of eigenvalues implicates a clear factor structure without substantial cross loading concerns. The structure combines with the Theoretical Framework of the study confirming that the measurement instrument effectively captures the intended variables. It provides additional evidence that Common Method Variance does not pose a significant threat to the validity of the findings (Appendix III).

4.4. Structural Model Analysis

The research employed PLS-SEM to test the direct hypothesized relations among the constructs. Based on Hair et al. (2021), the path coefficients significance in PLS-SEM is determined through bootstrapping procedures, which generate t-statistics and p-values. For this study, a threshold of $p < 0.05$ was established as the criterion for statistical significance. Table 4.11 and Table 4.12 presents the hypothesis testing results for all direct and moderation analysis of six proposed relationships.

4.4.1. Direct Effects Analysis

Table 4. 11. Hypothesis testing results (Direct effects)

Hypothesis	Path	Beta	T statistics	P value	Result
H_1	BDT → Operational Efficiency.	0.227	4.992	0.00	supported
H_2	BDT → Corporate Governance.	0.203	4.695	0.00	supported

As shown in Table 4.11, the two hypotheses received strong empirical support, with p values of 0.000 well below the 0.05 significance threshold. According to Henseler et al. (2016), such p-values indicate robust evidence for each hypothesized relationship. The t-statistics for all paths range from 4.695 to 4.992, all exceeding the critical value of 1.96. This statistical significance should be interpreted alongside effect sizes to determine practical importance (Sarstedt et al., 2020),

H_1: Bank Digital Transformation → Operational Efficiency (β = 0.227, t = 4.992, p = 0.000)

The first hypothesis proposed that digital transformation of the bank has a positive impact on its operational efficiency. The results strongly support a positive & path coefficient statistically significant ($\beta = 0.227$, $p < 0.001$). This shows when banks invests and implements in digital technologies like ATM mobile banking platforms, core banking systems and workflow automation. Its operational efficiency will improve meaningfully.

Prior studies align with this study. For instance, Agwu (2020) found digital transformation in the banking sector directly reduces processing times and operational costs and finally this is leading to efficiency gains. Similarly, Shanti (2023) demonstrated that banks implementation of digital tools experience less manual errors and faster service delivery. Gupta and George (2023) also found that adoption of digital technology improves operational performance through efficient workflows and better resource allocation. At the global level, Naimi-Sadig et al., (2022) conducted a cross-country study and concluded that digital transformation consistently improves bank efficiency, especially in emerging markets. In the Ethiopian context, Kaur et al. (2021) reported that implementation of digital banking positively affects commercial banks' performance, including operational metrics.

However, all evidence is perfectly consistent. Hernando and Nieto (2007) noted that internet adoption improved efficiency for Spanish banks but the benefits took time and not uniform across institutions. Similarly, Koetter et al., (2012) found that after overcoming initial implementation hurdles, some banks experienced efficiency gains. This suggests that the current study confirms a positive relationship, the magnitude of the effect may depend on other factors like implementation quality and organizational readiness.

Furthermore, these results align with the dynamic capabilities framework drawn by Teece (2014) and later applied by Warner and Wäger (2019). Digital transformation enables banks to recognize new opportunities, invest in technology, and continuously improve operational processes. Thus, H_1 is strongly supported.

H_2: Bank Digital Transformation → Governance Performance (β = 0.203, t = 4.695, p = 0.000)

Hypothesis two examined digital transformation improves corporate governance performance. The results confirm a positive and statistically significant path coefficient (β = 0.203, p < 0.001). It indicates when bank digitizes leads to governance outcomes such as transparency, accountability, regulatory compliance, and board oversight also improve.

Several recent studies consistent with this finding. Shafiq, Butt, and Tariq (2021) found that digital governance tools, including real time reporting dashboards significantly enhance corporate government performance. Similarly, Alsayegh et al., (2020) reported that digital transformation strengthened sustainability governance and board monitoring capabilities of banks. Furthermore, Li and Lou (2024) demonstrated that bank digital transformation directly improves corporate governance by enabling better data driven decision making. William et al., (2025) further confirmed that digital tools create more effective internal controls audit. This enhance accountability and reduce the risk of fraud.

However, Liu, Zhang, and Chen (2023) found internal control quality mediated and positively affects digital transformation with governance performance. In other words, digital tools alone are insufficient. Banks must implement internal control mechanisms in place to realize governance benefits. Ghertescu et al., (2024) added governance improvements from digital transformation depend heavily on regulatory enforcement and board digital literacy.

Agency Theory (Jensen & Meckling, 1976) provides a useful lens for this result interpretation. Bank digital transformation reduces information asymmetry between management and stakeholders through real time reporting and automated compliance thereby improving governance. It does not automatically improve governance rather; it provides tools to enable effective control through executives and boards exercise. As argued by Neely et al. (2021), strategic leaders who embrace digital tools can enhance oversight and accountability of the banks. Thus, H_2 is supported.

4.4.2. Moderation Effect Analysis

Table 4. 12. Hypothesis testing results (Moderation analysis effects)

Hypothesis	Path	Beta (β)	T-statistics	P-value	Result
H_3	EIA × BDT → Operational Efficiency	0.213	4.187	0.000	Supported
H_4	ETB × BDT → Operational Efficiency	0.225	4.637	0.000	Supported
H_5	EIA × BDT → Corporate Governance	0.277	6.507	0.000	Supported
H_6	ETB × BDT → Corporate Governance	0.171	4.152	0.000	Supported

The moderation analysis effects showed in Table 4.12, all four hypotheses received strong empirical support, with p-values of 0.000. According to Henseler et al. (2016), such p values indicate robust evidence for each hypothesized relationship. The t-statistics results range from 4.152 to 6.507 and exceeding the critical value of 1.96. Following Sarstedt et al. (2020) statistical significance and interpreted parallel with effect sizes to determine practical relevance.

H_3: Executives' Awareness of Innovation × BDT → Operational Efficiency (β = 0.213, t = 4.187, p = 0.000)

This hypothesis indicated that executive innovation awareness moderates and strengthens the relations between digital transformation and operational efficiency. The positive and significant effect ($\beta = 0.213$, $p < 0.001$) confirms that senior executives are more aware of and committed to innovation. This demonstrated advantages of digital transformation in terms of efficiency become increasingly significant.

This finding on operational benefits through digital initiatives aligns with Hameed et al., (2022) the innovation aware leaders actively remove bureaucratic obstacles and foster a culture of continuous improvement. Similarly, AlNuaimi, Singh, and Harney (2022) indicated innovative practice of leadership significantly enhances the effect of digital transformation on organizational performance. Furthermore, Schumacher and Gentsch

(2022) noted executives who recognize the strategic importance of innovation are more likely to allocate resources effectively and successful digital projects outcome.

Drawing on Agency Theory (Jensen & Meckling, 1976) showed that aligned managerial capacity and governance structures are necessary to ensure that executives prioritize long-term digital investments than short-term interests. Menon (2018) noted managerial awareness directly influences strategic renewal processes. When executives lack innovation awareness, digital transformation efforts may stall or fail to achieve with full potential. Some research suggests that awareness alone is insufficient. Benitez, Ray, and Henseler (2023) found that innovation awareness must be supported by empowerment and resource commitment to produce tangible efficiency results. Therefore, the study's results clearly support H_3.

Based on managerial point of view, this finding suggest that Awash Bank should need to prioritize enhancing innovation awareness among its executives through targeted training programs, exposure to emerging technologies, and engagement with fintech ecosystems. Leaders who comprehend innovation are better positioned to identify efficiency opportunities, allocate resources effectively, and overcome implementation barriers. Financial institutions like Banks that invest in innovation awareness programs are likely to see faster return on investment on their digital transformation investments.

H_4: Executives' Technical Background × BDT → Operational Efficiency (β = 0.225, t = 4.637, p = 0.000)

This hypothesis examined executives' technical background moderates the relationship between digital transformation and operational efficiency. It is supported with ($\beta = 0.225$, $p < 0.001$) value. This showed that when executives possess stronger technical knowledge and skills, the positive impact of digital transformation on efficiency is strengthen.

This finding is consistent with Benlian and Haffke (2016) executives with technical expertise are better equipped to understand, and implement digital initiatives effectively. Similarly, Li et al., (2021) demonstrated that technical backgrounds among senior leaders enhance cybersecurity decision making and technology adoption. Both of which contribute

to operational efficiency. Recently, Zhang (2024) reported that executive technical background positively moderates the relationship between digital transformation and bank performance with efficiency metrics.

Based on the dynamic capabilities framework (Teece, 2014; Warner & Wäger, 2023) executives with technical backgrounds are better able to sense technological opportunities, seize them through informed investments, and operations transformations. Helfat and Peteraf (2015) referred to this as "managerial cognitive capabilities," arguing that technical expertise enables leaders to make sound judgments about complex technological decisions.

However, Tost, Johnson, and Mackey (2019) found that the technical expertise is valuable and lead to overconfidence or micromanagement, potentially undermining team autonomy. Tost et al. (2019) noted that technical expertise may lead to overconfidence or micromanagement, the net moderation effect in this study is positive. This suggests that, in the context of the current study, the benefits of technical expertise like real time reporting, and automated compliance outweigh the potential drawbacks. The current study suggests that technical backgrounds are purely beneficial. Thus, H_4 is supported.

As far as Awash Bank is concerned, this finding comprehends that Banks should consider technical competence as a standard for Executive selection and promotion. When executives possess technical knowledge, they can better evaluate Digital Investment proposals, understand implementation hurdlers, and provide informed guidance to technical teams. Those Banks with technically competent executives are better positioned to achieve operational efficiency gains, as their executives can make more informed decisions about technology adoption and implementation.

H_5: Executives' awareness of innovation × BDT → corporate governance (β = 0.277, t = 6.507, p = 0.000)

The fifth hypothesis tested executive innovation awareness moderates the relationship between digital transformation and corporate governance performance. The interaction effect has strongest moderation hypotheses than technical backgrounds (β = 0.277, p <

0.001). The innovation aware executives significantly enhance the governance benefits of digital transformation.

Based on, Jebran and Chen (2022) innovation aware executives are more likely to adopt agile governance frameworks and embrace digital oversight tools. This makes governance more dynamic and effective and align with this study findings. Similarly, Abbes (2025) reported that strategic pathways for innovation in bank digital transformation depend critically on leadership's willingness. Further, Shafiq et al. (2021) noted executives with innovation are more proactive in implementing real time monitoring and automated compliance systems.

Proposed concept of "dynamic governance" by (Muller, 2023) showed traditional governance practices are often too slow for digital environments. Innovation aware bank executives understand and actively redesign governance processes by implementing block chain based on the audit trails (Aysan, Bergigui, & Disli, 2021) or AI driven compliance supportive tools (Tsai, Zheng, & Yan, 2020). Furthermore, Nahum (2025) noted innovation aware executives might prioritize growth than compliance and creating governance risks. Thus, H_5 is strongly supported.

H_6: Executives technical background × BDT → corporate governance (β = 0.171, t = 4.152, p = 0.000)

The final hypothesis investigated executives technical background moderates the relations between digital transformation and corporate governance performance. The result support by ($\beta = 0.171$, $p < 0.001$). This finding indicates that technically familiar executives can do to enhance the governance benefits of digital transformation. Studies from Tost, Johnson and Mackey (2019) found directors with strong technical skills are more adept at evaluating digital risks by assessing cybersecurity. Li et al. (2021) similarly reported that technical expertise among executives improves monitoring effectiveness particularly regarding technology related risks. Zhang (2024) added executives technical backgrounds help to create smooth interaction during board meetings and to evaluate digital transformation proposals critically.

According to Firk et al. (2022) for operational decisions, technical expertise matters most. While innovation awareness matters more for strategic corporate governance choices. Kikuchi (2025), showed technical backgrounds may sometimes lead executives to focus on technological details rather than broad outcomes. Therefore, the positive and significant moderation effect supports H_6.

In summary, all two direct and four moderation effect of hypotheses have strong empirical support at $p < 0.001$. Digital transformation's direct effects on operational efficiency ($\beta = 0.227$) was slightly stronger than its effect on corporate governance ($\beta = 0.203$). The moderation effects, executive innovation awareness had its strongest influence on corporate governance ($\beta = 0.277$). While executive technical background had its strongest influence on operational efficiency ($\beta = 0.225$). These suggest that innovation awareness is particularly valuable for governance improvements, whereas technical background is particularly valuable for operational gains.

Moderation effects in respect to managerial implication are significant and actionable. Awash Bank should develop targeted leadership development programs that address both Innovation Awareness and Technical Competence, recognizing that these complementary capabilities are essential for maximizing digital transformation benefits. Additionally, consider innovation orientation and technical proficiency when selecting executives and Board Members for digital related roles. Moreover, mandate Digital Leadership training for senior executives covering key digital and governance topics. Hence, incorporate digital transformation engagement and its impact on operational efficiency and governance into executive performance evaluations.

Practically, these findings demonstrate that executives awareness and technical knowledge serve as important moderators of the benefits of digital transformation at Awash Bank. A theoretical framework of (Hambrick & Mason, 1984; Neely et al., 2021) provides a comprehensive understanding of these results. Executive characteristics shape digital transformation initiatives implementation and the outcomes to produce. These findings demonstrate that executives' awareness and technical knowledge serve as important moderators and maximize the benefits of digital transformation at Awash Bank.

4.5. Simple Moderation Slope Analysis

According to Hayes (2022), simple slope analysis provides a practical approach for understanding how the relationship between a predictor and an outcome changes at different levels of a moderator variable. Following the recommendations of Aiken and West (2021), the simple slope is calculated using the formula where the slope equals the main effect of digital transformation plus the moderation effect multiplied by the specific moderator value:

Slope = $b(IV) + b(MoV \times IV \rightarrow DV) \times Moderator_Value$

Where:

- b(IV) = Main effect of independent variable on dependent variable
- b(MoV×IV → DV) = Moderation effect on dependent variable
- Moderator values: Low = Mean - 1 SD (-1), Average = Mean (0), High = Mean + 1 SD (+1)

Applying the simple slope formula at three standard levels of each moderator, the following Table 4.13 was calculated.

Table 4. 13. Simple Slope Analysis Results

Moderator	Outcome	Slope at Low	Slope at Average	Slope at High	Improvement (Low to High)
Executive Technical Background (ETB)	Operational Efficiency	0.002	0.227	0.452	+0.450
Executive Technical Background (ETB)	Corporate Governance	0.032	0.203	0.374	+0.342
Executive Innovation Awareness (EIA)	Operational Efficiency	0.014	0.227	0.440	+0.426
Executive Innovation Awareness (EIA)	Corporate Governance	-0.074	0.203	0.480	+0.554

Source: Survey data (2026)

4.5.1. Executive Technical Background and Operational Efficiency

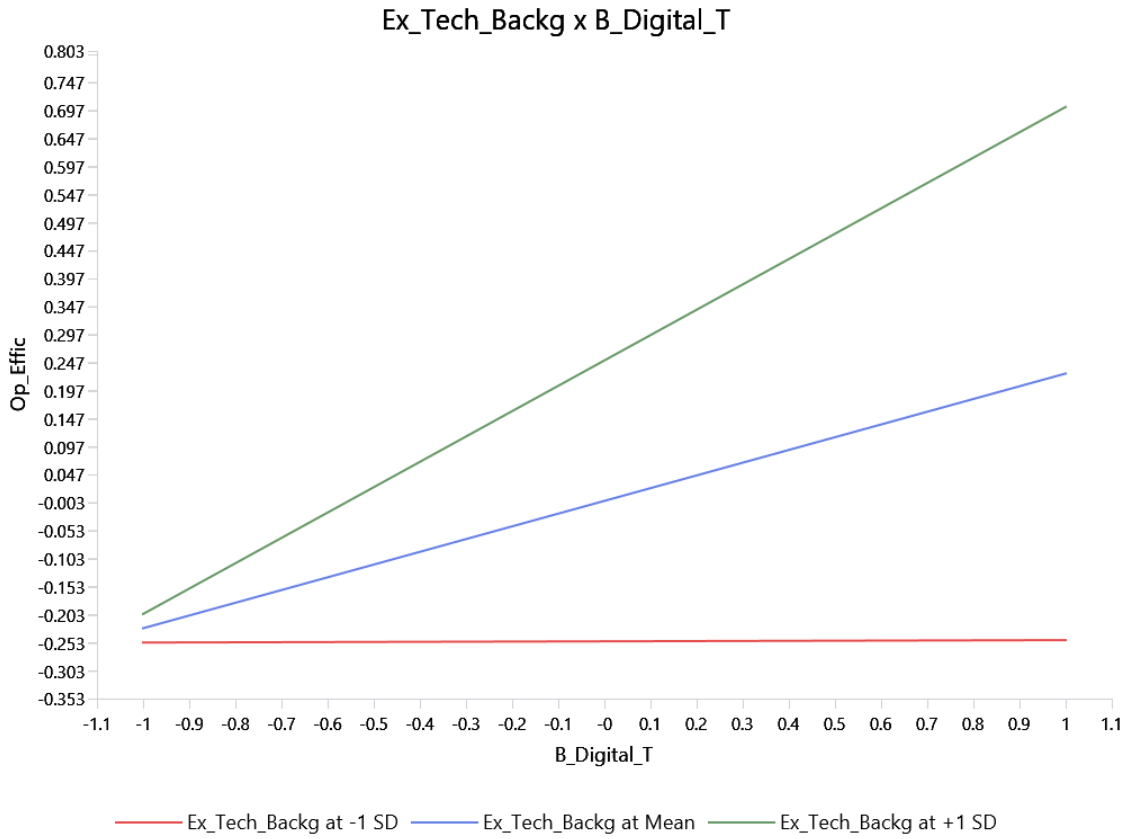


Figure 4. 2. Slope Analysis of Technical Background on Operational Efficiency

Source: Researcher 2026, Analysed in SmartPLS (Version 4.1.1.8)

As shown in Table 4.13 and Figure 4.2, when executive technical background is low, digital transformation has virtually no impact on operational efficiency the slope is a mere 0.002. This shows investing in digital technologies without technically competent leadership is like buying equipment and leaving it in the box. Therefore, the finding confirms that leadership competencies are essential for translating technology investments into actual performance (Carpenter, 2004; Neely et al., 2021). The actual performance improved from low level 0.002, when an executive's technical background reaches an average level, the slope increases to 0.227, and at high level to 0.452.

This remarkable increase of +0.450 from low to high, it highlights the critical importance of technical expertise at the leadership level (Helfat & Peteraf, 2015; Menon, 2018). These

results align with Zhang (2024) found that executive technical background positively moderates the relationship between digital transformation and bank performance with efficiency metrics. Similarly, Benlian and Haffke (2016) demonstrated executives with technical expertise are better equipped to understand and implement digital initiatives. Based on Technology Organization Environment (TOE) Framework (Tornatzky & Fleischer, 1990) argued that organizational outcomes reflect the arrangement of managerial incentives with shareholder interests. The organizational and technological factors that shape technology adoption. When executives lack technical knowledge, it is difficult to evaluate digital investments or troubleshoot implementation challenges (Menon, 2018; Firk et al., 2022).

4.5.2. Executive Technical Background and Corporate Governance Performance

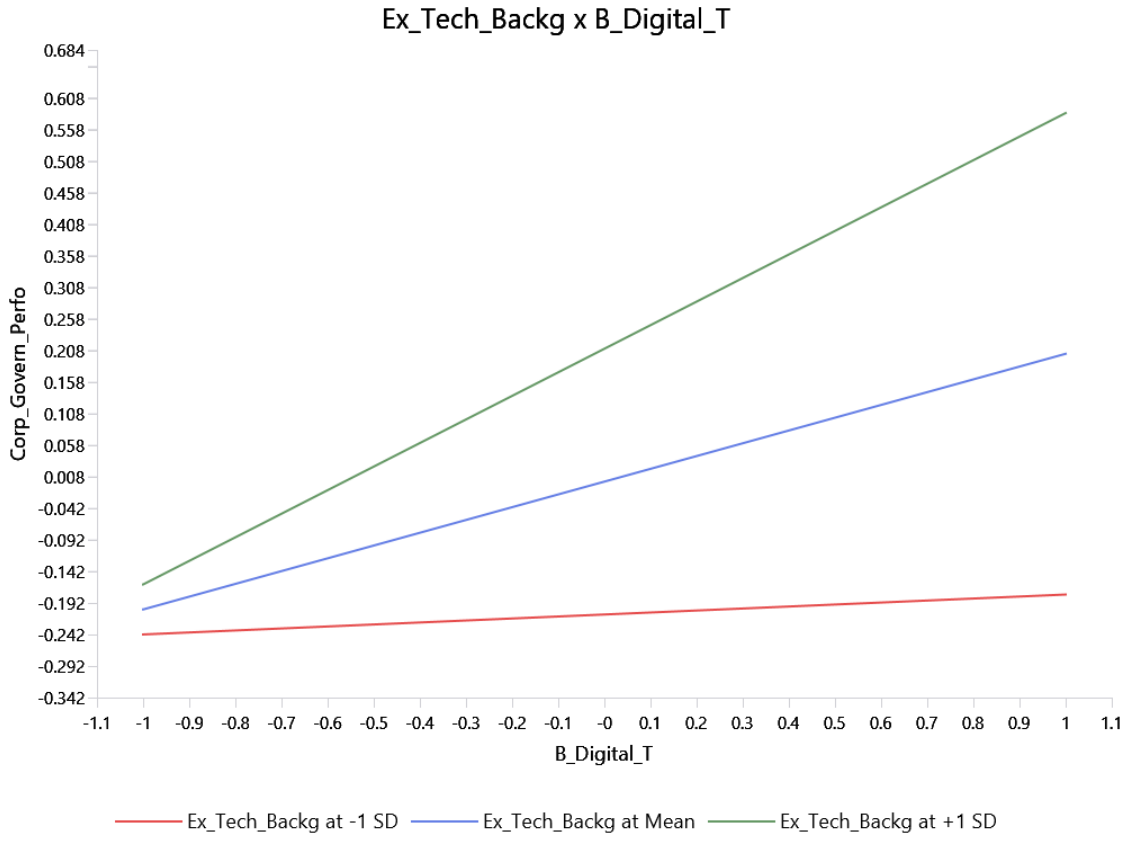


Figure 4. 3. Slope Analysis of Technical Background on Corporate Governance

Source: Researcher 2026, Analysed in SmartPLS (Version 4.1.1.8)

Table 4.13 and Figure 4.3 showed the performance of corporate governance. At low levels of executive technical background slope is 0.032. It indicated that governance benefits remain largely inaccessible without technically competent leadership. Tost et al., (2019) argued directors without technical knowledge difficult to evaluate digital risks, to assess cybersecurity readiness or hold management accountable for technology related decisions. Technical background slope increases to 0.374 at high levels; this demonstrates that strong technical expertise strengthens governance benefits (Li et al., 2021; Zhang, 2024). The improvement from low to high is +0.342, this confirm that technical background consistently strengthens digital transformation's effect on governance performance.

Moreover. Li et al., (2021) reported among senior executives, technical expertise improves board monitoring effectiveness. Likewise, Firk et al., (2022) noted that digital officers with strong technical backgrounds are more effective at bridging the gap between technological possibilities and governance requirements. In the Ethiopian banking context, where regulatory oversight is intensifying, having technically competent leaders (NBE, 2024). This is becoming not just an advantage but also a necessity (Gebremariam, 2023; Tadesse & Alemu, 2023).

4.5.3. Executive Innovation Awareness and Operational Efficiency

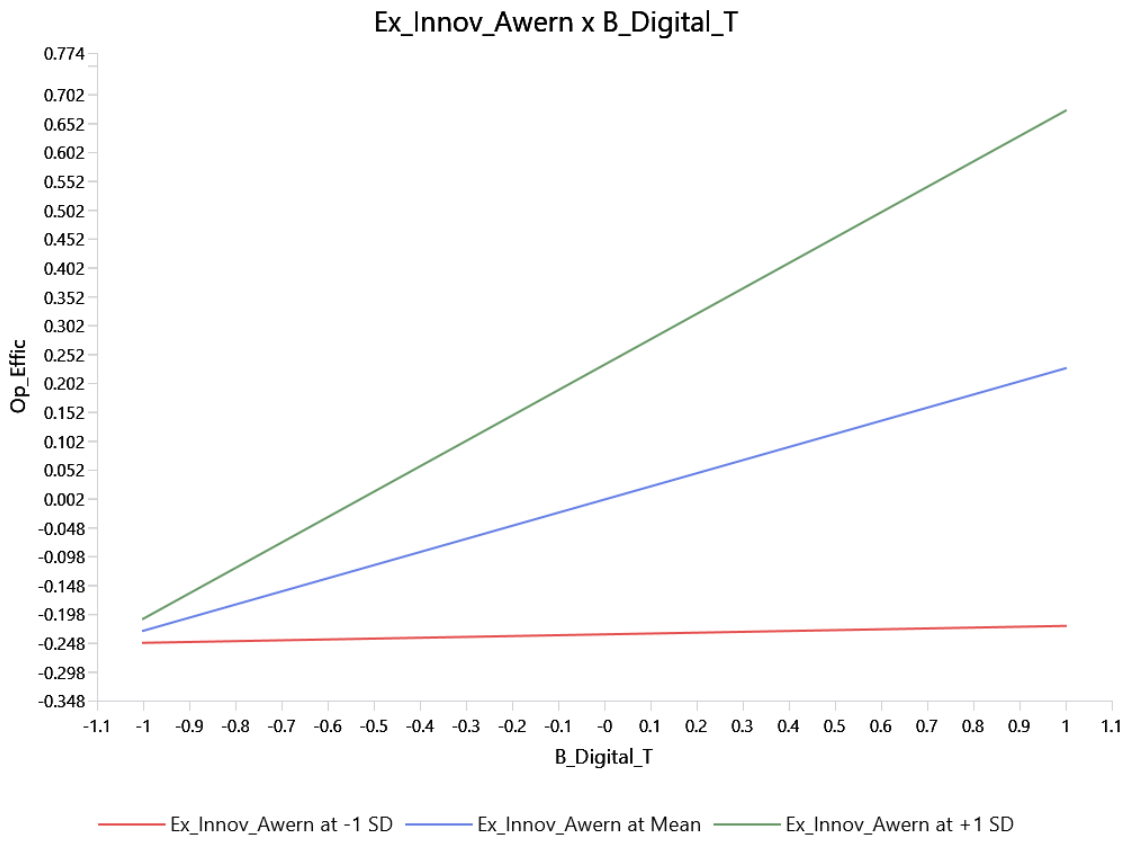


Figure 4. 4. Slope Analysis of Innovation Awareness on Operational Efficiency

Source: Researcher 2026, Analysed in SmartPLS (Version 4.1.1.8)

Table 4.13 and Figure 4.4 showed the slope for operational efficiency starts at 0.014 when awareness is low. It rises to 0.227 at average levels and reaches 0.440 at high levels. The pattern indicates both moderators are effective for efficiency gains and technical background holds a marginal advantage (0.452 vs. 0.440 at high levels). Though, high innovation awareness still delivers strong efficiency improvements. It makes it a valuable complement to technical expertise (Hameed et al., 2022; AlNuaimi et al., 2022).

According to Hameed et al, (2022), innovation aware leaders actively remove bureaucratic obstacles, and foster a culture of continuous improvement to accelerate the efficiency benefits of digital transformation. Similarly, AlNuaimi et al., (2022) found that leadership's innovation orientation significantly enhances the impact of digital transformation on

organizational performance. Schumacher and Gentsch (2022) added that executives who recognize the strategic importance of innovation are more likely to allocate resources effectively and complete digital projects. Thus, even without deep technical knowledge, leaders who value innovation can still help the bank realize substantial efficiency gains from its digital investments.

4.5.4. Executive Innovation Awareness and Corporate Governance Performance

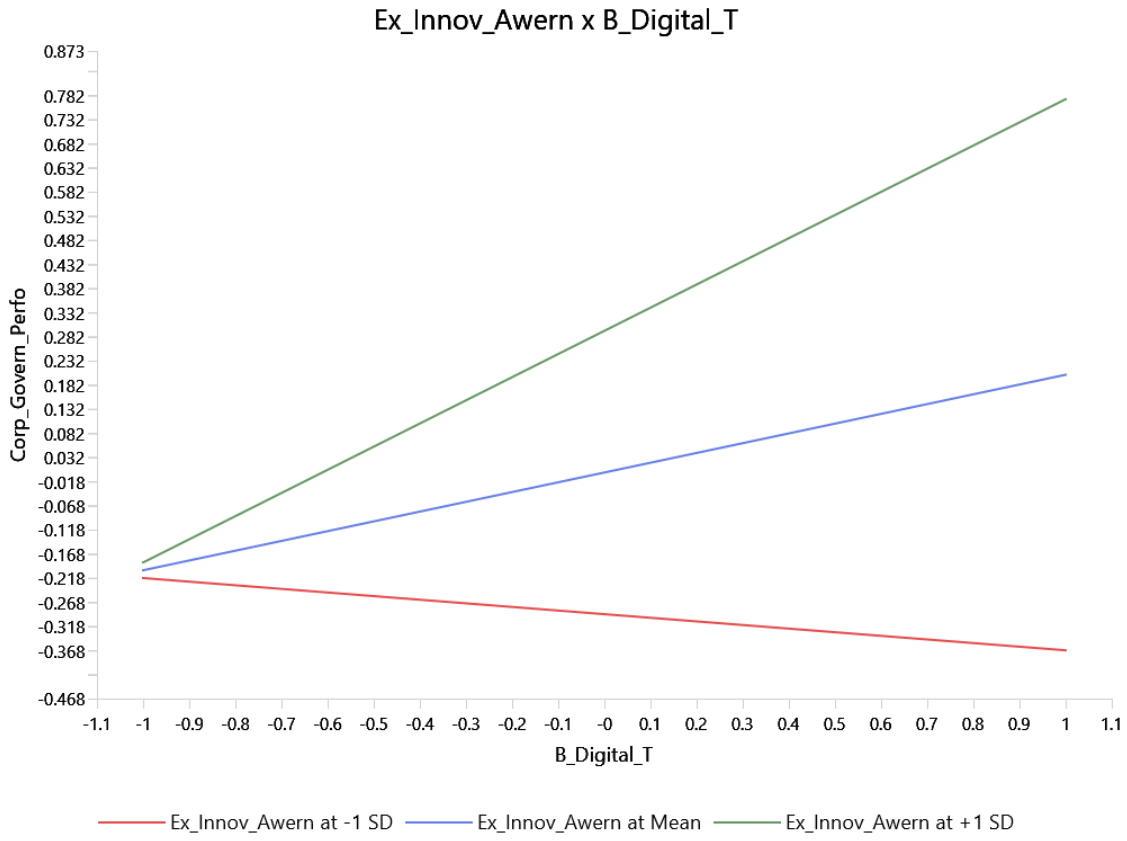


Figure 4. 5. Slope Analysis of Innovation Awareness on Corporate Governance

Source: Researcher 2026, Analysed in SmartPLS (Version 4.1.1.8)

As shown in Table 4.13 and Figure 4.5 concerns the moderation effect of innovation awareness on corporate governance performance. A negative slope of –0.074 when innovation awareness is low. According to Jebran and Chen (2022) and Nahum (2025), this negative value shows an important warning. Implementing digital transformation without adequate innovation awareness may actually harm governance performance. This finding

suggests that when leaders do not understand innovation, this can lead to confusion, resistance, or misuse of governance systems. This outcome is consistent with Agency Theory's prediction that poorly governed digital acceptance increases costs rather than reduces agency costs (Jensen & Meckling, 1976). During digital tools are used without strategic innovation awareness, this may introduce additional monitoring burdens and employee resistance. Innovation awareness reaches an average level on the slope (0.203), and at high levels 0.480 the highest slope across all conditions. The improvement from low to high is notable +0.554. This suggests that for governance outcomes innovation awareness is the more useful moderator when compared to technical background 0.374 at high levels.

Jebran and Chen (2022) found innovation aware executives are more likely used digital oversight tools and to adopt agile governance frameworks. This makes governance more effective. Abbes (2025) reported strategic pathways for innovation in bank digital transformation depend critically on leadership's willingness. Muller (2023) introduced the concept of "dynamic governance," arguing that traditional governance practices are often too slow for digital environments. The negative slope at low awareness levels is consistent with Nahum (2025), noted that leaders who resist innovation might create governance risks by sticking to outdated manual processes

Banks should prioritize different options based on executive characteristics for different outcomes (Richter et al., 2020; Benitez et al., 2020). Innovation awareness for governance improvements and technical expertise for efficiency gains. The negative governance slope, when innovation awareness is low −0.074 sends a clear signal. This was attempting to drive digital transformation without leadership buy in for innovation may do more harm than good (Nahum, 2025; Jebran & Chen, 2022). In addition, (Hambrick & Mason, 1984) shows executive characteristics at different levels. The simple slope analysis reveals that the relationship between digital transformation and organizational outcomes is not linear it is liable on executive capabilities. In conclusion, the benefits of digital transformation depend critically on executive leadership capabilities (Neely et al., 2021; Carpenter, 2004). When executive technical background is low and slope is nearly zero, the bank sees minimal returns from its digital investments. At average levels, reasonable value emerges.

At high level, the bank maximizes returns across both operational efficiency and corporate governance outcomes.

The most vital managerial suggestion from this finding is that adopting Digital Transformation without ensuring innovation awareness among executives can actually be counterproductive for governance outcomes. Specific to this study Awash Bank need to conduct a comprehensive assessment of existing executives' innovation awareness and provide targeted development programs alongside with major digital transformation initiatives. Corporate Governance related digital investments should be preceded by executive education to ensure that leaders understand and support the governance implications of digital transformation. Negative slope at low awareness levels also suggests that Banks should consider innovation awareness as a key selection criterion for executives and board members, as leaders who resist innovation may inadvertently undermine governance effectiveness during digital transformation.

4.6. Coefficient of Determination (R^2)

Evaluating structural models in PLS-SEM analysis involves using three key criteria. These are the coefficient of determination (R^2), the effect size (f^2), and the predictive validity (Q^2). This study follows the three step evaluation process suggested by Hair et al. (2021), starting with R^2 to see how much variance in the dependent variables is explained by the independent variables, followed by f^2 to assess the unique contribution of each predictor, and finally Q^2 to assess the predictive significance using a blindfolding technique.

Table 4. 14. Explanatory power (R2)

Construct	R-square	R-square adjusted
Corporate Governance Performance	0.698	0.693
Operational Efficiency	0.688	0.683

As shown in Table 4.14, the R^2 values for both endogenous variables demonstrate substantial explanatory power. The adjusted R^2 values being nearly identical due to the adequate sample size. Specifically, corporate governance performance has an R^2 of 0.698 (adjusted: 0.693). It indicates that the combination of bank digital transformation,

executive innovation awareness, and executive technical background explains 69.8% of the variance in CGP. According to Chin (2009) R^2 values of 0.67 are considered substantial, and 0.698 exceeds this threshold. It represents a substantial level of explanatory power. Hair et al. (2021) noted that R^2 values above 0.75 are generally considered substantial and above 0.50 are considered moderate to substantial in many social science contexts. Based on this, 0.698 reflects a strong explanatory model where the predictors capture more than two thirds of the variation in governance performance.

Operational efficiency R^2 of 0.688 (adjusted: 0.683) similarly shows 68.8% of the variance is explained by the three predictor variables. This value similarly exceeds Chin's (2009) substantial threshold of 0.67. This indicates that the structural model has strong explanatory power for both outcomes. Therefore, the R^2 values of 0.698 and 0.688 are exceptionally large and exceed the 0.50 threshold for large effects. These findings demonstrate that the proposed theoretical framework of digital transformation influences governance and efficiency through executive characteristics, has strong empirical support. This captures the key drivers of organizational outcomes. The results indicate that the model can explain 68.8% of the variance in operational efficiency, 69.8% of the variance in corporate governance performance. Both values exceed Chin's (2009) substantial threshold of 0.67, indicating that the structural model has strong explanatory power for study outcomes.

High R^2 values reported in this perception based organizational research may be high due to several factors. One of the negative impacts of Perceptual measures is that it reflects subjective evaluations. With respondents cumulative positive or negative biases influencing ratings across constructs and inflating relationships. Notwithstanding, these issues, the R^2 values (0.688 and 0.698) are comparable to or slightly higher than those in similar studies in banking and management research like Srivastava (2014). However, these values should be cautiously interpreted as representing explained variance in perceptions, not objective performance. On the side of managerial perspective, the high R^2 values commends that the combination of digital transformation and executive characteristics explains a substantial portion of variation in perceived organizational outcomes. It implies that banks requiring to improve both Operational Efficiency and

corporate governance performance should focus on simultaneously developing digital capabilities and executive leadership competencies.

Effect Size (f^2) and Predictive Relevance (Q^2)

Based on Hair et al. (2021), R^2 indicates the overall explanatory power of a model. It does not reveal the unique contribution of each individual predictor variable. To address this gap, effect size (f^2) measures the change in R^2 during a specific exogenous construct is removed from the model. Cohen (2013) stated that f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effect sizes, respectively.

Table 4. 15. Effect size (f2)

Predictor	Corporate Governance Performance	Operational Efficiency
Bank Digital Transformation	0.074	0.091
Executive Innovation Awareness	0.134	0.082
Executive Technical Background	0.067	0.092
Executive Technical Background × BDT	0.048	0.081
Executive Innovation Awareness × BDT	0.121	0.069

Source: Survey data (2026)

Table 4.15 shows the effect sizes this study. For corporate governance performance, bank digital transformation has an f^2 of 0.074, which falls between Cohen's (2013) small (0.02) and medium (0.15) benchmarks. This indicated a small to medium unique contribution. Executive innovation awareness shows an f^2 of 0.134 on corporate governance performance. It is approaching the medium benchmark of 0.15 and indicating a small-to-medium effect. Executive technical background has an f^2 of 0.067 on corporate governance performance. This is also in the small to medium range. For operational efficiency, the bank digital transformation shows an f^2 of 0.091. It is representing a small to medium effect. Executive innovation awareness demonstrates an f^2 of 0.082 on operational efficiency. The executive technical background shows an f^2 of 0.092.

Although all direct effect f^2 values exceed the 0.02 threshold considered meaningful (Hair et al., 2021). In this study exceed this minimum threshold. This is confirming that each predictor makes a meaningful unique contribution to explaining both governance and efficiency performance. Therefore, all f^2 values exceed Cohen's (2013) small benchmark of 0.02. This confirms that every hypothesized relationship makes a meaningful contribution to the model. The moderation effect of executive characteristics are particularly important for enhancing the governance benefits of digital transformation.

Predictive Relevance (Q^2)

Based on Geisser (1974) and Stone (1974), Q^2 is derived from a blindfolding procedure where the model is repeatedly re-estimated while leaving out specific data points.

Table 4. 16. Predictive Relevance (Q^2)

Endogenous Construct	Q^2 predict	Predictive Relevance
Corporate Governance performance	0.617	High
Operational Efficiency	0.607	High

Source: Survey data (2026)

Chin (2009) and Henseler et al. (2016) state that a model demonstrates predictive relevance when Q^2 values are above zero. It is indicating endogenous constructs predicts more accurately than simply using their average values. Hair et al. (2021) and Cohen (2013) suggests that Q^2 values of 0.02, 0.15, and 0.35 represent weak, moderate, and strong predictive relevance, respectively.

Based on Table 4.16, corporate governance performance shows a Q^2 of 0.617, which falls within the high predictive relevance above 0.35 range. Operational efficiency demonstrates Q^2 of 0.607, also indicating high predictive relevance. According to Hair et al. (2021), for large sample sizes, Q^2 values are expected to be higher than 0.35, which is seen as a strong sign of predictive relevance. The study confirms that none of the Q^2 values was negative. This shows that the model estimates the main ideas accurately. Therefore, the presence of

positive Q^2 values across both endogenous constructs shows that the model possesses strong predictive relevance.

Summary of Structural Model Evaluation

In summary, the structural model assessment showed good results. All R^2 values are above 0.68 indicates strong explanatory power (Cohen, 2013; Chin, 2009). All f^2 results showed paths are above the minimum threshold of 0.02, with approaching the median threshold of 0.15. This suggests that each predictor makes a meaningful contribution to explaining the variance in the dependent variables (Cohen, 2013). Furthermore, the Q^2 values are consistent with these high R^2 values and exceed 0.35, indicating strong predictive validity (Hair et al., 2021). According to Hensler et al. (2016), the good model in all three areas can be considered both powerful in explaining the R^2, f^2, and Q^2 relationships and this model meets the criterion.

Thus, the relationships are not only statistically significant but also practically useful and likely to hold true in new samples (Shmueli et al., 2019).The study's structural model suggests that the hypothesized relationships are both statistically significant and practically meaningful. These findings provide strong empirical support for the theoretical framework and provide valuable insights for bank managers to improve the outcomes of their digital transformation efforts (Henseler et al., 2016; Hair et al., 2021). As per the structural model evaluation, the combination of digital transformation and executive characteristics forms a robust framework for understanding and improving organizational outcomes in the banking sector. In regard to Awash Bank and other Ethiopian banks, these findings would provide evidence-based guidance for strategic decision making regarding digital investments, executive development, and governance enhancement.

CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

This chapter focuses on main findings of the study, presents conclusions based on those results, provides recommendations, and suggests directions for future research.

5.1. Conclusions

The primary objective of this research is to examine how executives' innovation awareness and technical expertise influence the link between bank digital transformation and corporate governance performance and operational efficiency. The study developed and empirically tested structural model using PLS-SEM, based on survey data collected from Awash Bank head quarter and regional offices stationed in Addis Ababa.

A key finding related to the first and second objectives were examine the direct effect of bank digital transformation on corporate governance performance and operational efficiency. The direct effect analysis revealed that bank digital transformation improve operational efficiency ($\beta = 0.227$, $p < 0.001$) slightly more than it improves corporate governance ($\beta = 0.203$, $p < 0.001$). This indicates that digital tools bring immediate, tangible improvements to processes like real-time reporting and enhanced service delivery in all operational aspects. Similarly corporate governance enhancement through digital capabilities such as real time reporting and automated operational and regulatory compliance contributes to greater transparency and accountability. This direct effect establishes a foundational understanding, showing that digital transformation significantly drives positive change in banks.

Consequently, regarding objective three the study investigate the moderating role of executive innovation awareness on the relationship between bank digital transformation and operational efficiency. The analysis demonstrates that executive innovation awareness significantly moderates the bank digital transformation to operational efficiency relationship. It enhances operational efficiency gains ($\beta = 0.213$, $p < 0.001$). This confirms high level of executives innovation awareness dramatically unlock greater efficiency gains. This boldly highlights the risks of digital change without informed leadership of the bank.

Additionally, regarding objective four the study investigate the moderating role of executives' technical background in the association between bank digital transformation and operational efficiency. The results reveal that executives' technical background significantly strengthens the positive effect of digital transformation on operational efficiency ($\beta = 0.225$, $p < 0.001$). This confirms that technically skilled executives radically increase the benefits of efficient banks operation, whereas low awareness can even slightly worsen operation outcomes.

Similarly, regarding objective five the study investigate the moderating role of executive innovation awareness on the relationship between bank digital transformation and corporate governance performance. The results reveal that executive innovation awareness significantly enhances the governance benefits of digital transformation ($\beta = 0.277$, $p < 0.001$). Notably, low innovation awareness can even slightly worsen governance outcomes. This is highlighting the risks of digital change without informed leadership.

In addition, regarding objective six the study examine the moderating role of executive technical background on the relationship between bank digital transformation and corporate governance performance. The analysis demonstrates that executive technical background significantly strengthens the positive effect of digital transformation on operational efficiency ($\beta = 0.171$, $p < 0.001$), with a meaningful effect size ($f^2 = 0.081$). Without executives' technical expertise, digital transformation hardly improves bank performance. However, with strong leadership expertise the effect nearly doubles.

The joint moderator analysis highlights the enabling characteristics of digital transformation to drive the strongest improvements in both operational efficiency and governance performance. On the other hand, a lack of technical capability and awareness of the executives can significantly reduce these benefits and even set back digital transformation efforts. This combination of enabling characteristics positively determines that successful digital transformation depends not only on technology itself but also on skilled innovative leadership.

Moreover, the research model used in this research proves strong explanatory power, explaining the variation in the key outcomes (R^2 = 0.698 for governance & 0.688 for efficiency). Moderation effects also contribute to these results with innovation awareness on governance (f^2 = 0.121) and technical background on efficiency (f^2 = 0.081) the most. Furthermore, the predictive relevance Q^2 results show above of 0.607 for all endogenous constructs, indicating high predictive relevance of the study model. Overall, the findings indicates that while digital transformation independently drives the work, its full potential is unlocked only when supported by competent technical skills and innovative management.

Furthermore, these findings improve our understanding by showing that digital transformation alone does not simply improve governance performance or operational efficiency. Instead, its success largely depends on the technical skills and innovative mindset of bank executives. This insight highlights the effectiveness of digital initiatives is highly linked to the organizational context especially the leadership's capabilities. Therefore, the study reveals that if executives lack adequate innovation awareness, digital transformation can significantly harm governance performance, challenging the widespread assumption that investing in digital technologies is always advantageous.

From the practical standpoint, these findings have important implications for Awash Bank and the broader banking industry. They suggest that banks cannot merely rely solely on adopting new banking technologies. The actual value comes the real value digital efforts are aligned with strong executive innovation awareness and technical expertise. For instance, if the bank executive team has limited technical background, digital investments impossible to yield meaningful improvements. At average leadership levels, banks will see some benefits, but the biggest returns happen when executives bring high levels of technical skill. This is unlocking significant gains in both operational efficiency and governance performance.

In general, the study indicates banks to move beyond viewing digital transformation as just a technology upgrade, rather, must requires developing executives' innovation mindset and technical capabilities. As digital transformation continues to reshape banking landscape,

building these leadership capabilities will be vital to maintaining competitive advantages. Without such efforts, banks risk not only falling short of expected benefits but also facing adverse effects on their operations and governance performance.

As a student engaged in exploring MSc in International Business the study's contribution to International Business lies in demonstrating how contextual factors specifically executive characteristics in an emerging African market shape digital transformation outcome differently than in developed economies. Improved digital efficiency would also enhance international trade as banks are an important player for border crossing transactions. Outcome of the study reveal that in emerging markets like Ethiopia, where institutional frameworks are evolving and digital infrastructure is developing, executive capabilities play an even more critical moderating role than in developed banking contexts where digital maturity is higher. The insight extends International Business literature by showing that the effectiveness of technology transfer and adoption in emerging markets depends significantly on domestic leadership competencies, challenging the assumption that technology solutions can be uniformly applied across different institutional environments.

5.2. Recommendations

Based on these finding, the study strongly recommends that banks to perceive digital transformation not just as a technology upgrade, but as an opportunity to develop and focus their leadership team. Specifically, Awash Bank's board of directors, in together with the strategy committee should require a minimum of 40 hours of digital engagement training per year for executive level managers and assessed a digital leadership competency framework. The training program includes all digital departments, participating in overseas training on emerging technologies, and actively engaging with fintech communities. Empirical findings supported this recommendation that executive innovation awareness strengthens the BDT, corporate governance relationship ($\beta = 0.277$) signifying that targeted training programs can significantly improve governance outcomes. 40 hours minimum is derived from the finding that at average awareness levels, governance benefits emerge (slope = 0.203), but at high awareness levels, benefits nearly triple (slope = 0.480).

Additionally, banks should actively cultivate an innovation and technical expertise first mindset among their leadership teams. The research shows that when executives' genuinely understand and embrace innovation and technical capabilities of their leaders it directly boosts corporate governance performance and operational efficiency resulting the bank to enhanced customer service and improved regulatory compliance. To make this shift happen, banks should consider investing in dedicated innovation labs, partnering with fintech accelerators such as Ethio Telecom (tele birr) and Safaricom(M-Pesa) and actively encourage leaders to immerse themselves in industry events and overseas advanced trainings. The suggestion is empirically stranded in the finding that Technical Background significantly improves Operational Efficiency ($\beta = 0.225$) and that the mixture of Innovation Awareness and Technical Expertise produces the strongest outcomes, specifically when executives demonstrate high levels of both characteristics (slope improvements of +0.450 and +0.554).

Furthermore, banks should need to foster a prioritize approach that addresses both direct and indirect effects a dual strategy is highly recommended rather than relying only exclusively on leadership development or exclusively on technology implementation. Digital transformation investments should be matched with simultaneous efforts to strengthen executives' technical backgrounds and innovation awareness. The simple slope analysis clearly demonstrated that when executives' innovation of awareness and technical background are high, digital transformation produces exceptionally strong effects. On the other hand, when these traits are lacking, digital transformation may produce little benefit or have harmful effects.

The recommendation of dual strategy is directly derived from the finding that technology alone (direct effect $\beta = 0.203$-0.227) produces moderate benefits, but when combined with high executive capabilities, the effects more than double (slopes reaching 0.452-0.480). It suggests that the returns on digital investments are significantly amplified when paired with leadership development.

Moreover, have a critical responsibility to oversee the progress of digital transformation and ensuring that executive development is being prioritized by the bank. They should demand regular reports on digital performance and executive training activities, and closely monitor how these operations are influencing corporate governance performance.

Finally, these findings underscore for regulators and policymakers, supporting digital transformation is vital not only for a bank's but also plays an essential role for overall governance operations. Banks that advance digitally tend to exhibit stronger risk management and compliance frameworks. At the same time, it is equally important to remain alert to emerging technological risks such as cyber-attack pressure and algorithmic biases.

In Ethiopia's emerging banking market, especially technical background play a stronger moderating role in digital transformation effects than in developed markets, where digital infrastructure is more advanced as per the studies. Executives' technical expertise meaningfully influences operational efficiency nearly as much as digital transformation itself, underscoring leadership's vital role. Policymakers like the National Bank of Ethiopia, the study suggests updating regulations to include leadership competencies such as digital literacy and innovation awareness, establishing industry wide digital leadership standards, and mandating reporting on executive training. For Awash Bank specifically it suggests appointing members with strong technical skills, providing continuous digital training, forming digital oversight committees, and incorporating digital leadership metrics into executive evaluations and succession planning.

5.3. Limitation and Future Research Directions

The study believed to provide essential view on the way digital transformation plays pivotal role for their existence and remain competitive in the market. Recognizing limitation is also very important for future research directions. Cross sectional is the main design employed for this study. Future studies should adopt longitudinal approaches that track variables over time. Furthermore, the captioned research finding also specific to the Ethiopian banking industry explicitly to Awash Bank. Hence, future research can

investigate a wider range of settings like comparing banks across different countries or regions and other regulated industries like insurance and telecommunications.

Furthermore, future studies can unbox different useful factors that were uncovered in this study, like Organizational dynamism and culture, employees' digital literacy, nature of banking competition etc. It is also important would be to comprehend how these elements might strengthen or weaken the relationships examined in this study.

At the last, this study commends executive capability as vital for successful bank digital transformation, emphasizing the need for Ethiopian banks, especially Awash Bank, to invest equally in digital infrastructure and executive skills. Its focus on Awash Bank limits generalizability, suggesting future research should include diverse banks to better reflect the sector. Supporting existing and ongoing theories, the study calls for context specific theoretical development and deeper analysis of Ethiopia's banking digitalization context. Future research needs to address national factors influencing digital transformation and explore constraints to sustainable improvements in operational efficiency and corporate governance.

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ANNEXES

Appendix I: Questionnaire for Awash Bank Officers

Dear Participants,

This questionnaire is designed to collect data for a research study entitled *"Effect of Bank Digital Transformation on Operational Efficiency and Governance Performance: moderating Role of Executive characteristics. A Case of Awash Bank."* The study is being conducted in partial fulfillment of the necessities for MSc degree in International Business at Addis Ababa University. You are kindly requested to provide honest and accurate responses. The data used solely for academic purposes and will not be disclosed to any third party.

Please read each question carefully before responding.

For any queries, you can contact me chalatad1@gmail.com 0911228926

Section A: Background Information

1. What is your gender?

   Male

   Female

2. In which age group do you belong?

   15-25 years

   26-35 years

   36-45 years

   46 and above

3. Your education level?

   Diploma

   Bachelor Degree

   Master' Degree

PhD

4. Your designation Status?

Branch/Area Manager

Director

Executive

Chief Executive Officer (CEO)

Member of Board of Directors

5. Your work experience?

< 2 years

2 - 5 years

6 - 10 years

> 10 years

Section B: Variable Based questions

Please respond to the following statements by placing a ✓ in the box that best represents your level of agreement using the scale below:

1: Strongly Disagree 2: Disagree 3: Neutral 4: Agree 5: Strongly Agree

		Rating Scale				
		1	2	3	4	5
No	*Bank Digital Transformation*					
1.	The integration of digital technology has fundamentally changed Awash Bank's business model.					
2	Digital transformation enables Awash bank to streamline its operations and promotes financial inclusion by reaching unbanked population across the country.					
3	Awash Bank have successfully transitioned most of our traditional "over-the-counter" services to digital platforms.					
4	Digital technology is deeply entrenched in Awash Bank's core banking products and service delivery channels.					

5	Awash Bank has a formal, dedicated department or task force for driving digital innovation.					
6	Digital technologies allow banks to reduce the overhead cost while improving service delivery time.					
	Executives' Awareness of Innovation					
7	Awash Bank senior executives view digital technology as the key driver of the bank's future success, and actively participate in digital transformation project activities.					
8	Awash Bank Borad of Directors regularly discusses technological dynamism and disruptions during their strategy meetings.					
9	Executive management of Awash Bank encourages employees to bring innovative ideas that supports bank's ongoing digital transformation activities.					
10	Awash bank's top leadership has a strong Digital Mindset and prioritizes digital fluency in their recruitment policy.					
11	Awash Bank's Executives technological knowhow makes it possible to support to tap new opportunities and market trend.					
12	Under increasing pressure for innovation in a very dynamic banking environment, Awash Bank's executive management actively identify the need for change and effectively manage it.					
	Executives' Technical Background					
13	Technical skills such as data analysis and programming are essential for effective navigation of digital transformation in the bank.					
14	Executives with overseas backgrounds mainly contribute to the digital transformation within bank by enhancing innovation capabilities.					
15	The executives of Awash Bank have a combination of technical, business, and people-oriented competency to achieve banks digital transformation					
16	Banks executives with academic background can significantly promote the digital transformation by improving innovation input					
17	Executives of Awash Bank understands complex banking technologies.					
18	A technical expertise of Awash Bank executives' makes better technological decisions.					

	Operational Efficiency					
19	Digital transformation helps Awash Banks to stay relevant in the market competition and to remain competitive in operational aspect.					
20	Digital transformation has significantly enhanced efficiency of Awash Bank's overall operations.					
21	The adoption of Bank digital transformation has developed and improved the bank's management performance and achieved stakeholder objective in upgrading banking services.					
22	Human errors and operational risk have been substantially decreasing since the adoption of digital audit tools.					
23	Awash Bank's Digital transformation has led to significant reduction in bank's operating expenses when compared to the legacy system.					
24	Employee productivity in Awash Bank has significantly improved following the application of digital technology.					
	Section E: Corporate Governance Performance					
25	Awash Bank's Implementation of real time monitoring and automated compliance system has reduced report delays, minimized errors, and enhanced the reliability of internal control.					
26	The execution of digital transformation in Awash Bank has strengthen the existing governance structure; this enables to be more proactive and data driven decision making process.					
27	Awash Bank's digital tools have significantly improved the Board's ability to monitor bank activities and investigate Key Performance Indicators (KPIs) in real time.					
28	The banks digital transformation enhances communication between regulatory organs (NBE), auditors, corporate management and creates stronger compliance and governance enforcement.					
29	Bank's digital transformation is not solve for all difficulties, so with strategic adoption supported by policy framework can significantly enhance corporate accountability, transparency and sustainability in emerging market.					
30	Banks digital transformation is effective in creating immutable audit trials that limit opportunity for manipulation especially environments exposed to corruption and wrong financial practices.					

Appendix II: Mahalanobis Distance Analysis SPSS Results

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.1339	3.1570	2.1469	.34546	345
Std. Predicted Value	-2.932	2.924	.000	1.000	345
Standard Error of Predicted Value	.021	.094	.039	.011	345
Adjusted Predicted Value	1.1051	3.1074	2.1461	.34510	345
Residual	-.94352	1.89995	.00000	.37658	345
Std. Residual	-2.495	5.023	.000	.996	345
Stud. Residual	-2.520	5.094	.001	1.004	345
Deleted Residual	-.96296	1.95412	.00080	.38263	345
Stud. Deleted Residual	-2.540	5.292	.002	1.010	345
Mahal. Distance	.034	20.123	2.991	2.438	345
Cook's Distance	.000	.185	.004	.014	345
Centered Leverage Value	.000	.058	.009	.007	345
a. Dependent Variable: CGP_M					

Appendix III: Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.214	50.714	50.714	14.707	49.024	49.024
2	2.289	7.630	58.345			
3	1.829	6.098	64.443			
4	1.454	4.848	69.291			
5	1.308	4.361	73.651			
6	.497	1.656	75.307			
7	.467	1.558	76.865			

8	.448	1.493	78.358			
9	.427	1.424	79.781			
10	.417	1.391	81.173			
11	.402	1.339	82.512			
12	.364	1.213	83.726			
13	.359	1.197	84.922			
14	.357	1.190	86.112			
15	.340	1.135	87.247			
16	.336	1.121	88.368			
17	.319	1.063	89.431			
18	.314	1.047	90.479			
19	.294	.980	91.459			
20	.287	.955	92.414			
21	.278	.925	93.339			
22	.266	.887	94.226			
23	.259	.863	95.088			
24	.248	.828	95.916			
25	.239	.797	96.713			
26	.226	.752	97.466			
27	.216	.720	98.185			
28	.202	.672	98.858			
29	.188	.628	99.486			
30	.154	.514	100.000			