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Factors Determining Internal Audit Effectiveness: Empirical Evidence from Large Manufacturing Companies in Tigray, Ethiopia

Fantay Alemayoh [1], Azenaw Gebrekidan [1], Birhane Tsegay [1]

[1] Department of Accounting and Finance Raya University, Maichew , Ethiopia

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Correspondence :
Fantay Alemayoh Berhe
fantayalemayoh@gmail.com.

Abstract

This study explores factors determining internal audit effectiveness within large manufacturing companies in the Tigray region of Ethiopia. The topic has received limited scholarly attentions, particularly in the context of developing counties. Recognizing the absence of universally accepted assessment frameworks, the research employs mixed methods approach, drawing on data from questionnaires and focus group discussions conducted across 34 active large manufacturing firms. Quantitative analysis was applied using an ordered logit regression model, complemented by qualitative content analysis to capture deeper organizational insights. The study has examined the influence of several factors, including internal auditors' independence, competency and experience, internal audit department's size, existence of an approved audit charter, and presence of an audit committee on internal audit effectiveness. The findings reveal that independence, management support, and competency have a positive and statistically significant impact on internal audit effectiveness. These insights could have critical implications to policy makers and regulators seeking to strengthen internal audit standards and practices by ensuring compliance with regulations, updating audit documents, documenting policy changes, and keeping auditors informed of new laws and guidelines. The findings also imply that corporate leaders should enhance operational efficiency and internal control systems by fostering audit independence through clear policies, adequate trainings, and unrestricted access to information while allocating sufficient resources, recruiting competent auditors, and supporting continuous professional developments.

Keywords: *Internal audit effectiveness, manufacturing companies, mixed approach, ordered logit model*

1. Introduction

The advent of modern manufacturing industry has significantly transformed the global economy, leading to ongoing enhancements of labor productivity and economic well-being (Maddison, 2001; Tesfaye, 2006). Ethiopia stands out in Africa for its comprehensive industrial development strategy since the early 2000s, prioritizing manufacturing due to its potential for economic growth, wealth creation, and job opportunities (Mishra, 2018). Despite being in its early stages, Ethiopia's manufacturing sector has notably contributed to the nation's economic progress (Arkebe, 2018; Melaku et al., 2021; Tekeba, 2018). Evaluating the effectiveness of internal audits in these companies is crucial, as it aids policymakers, scholars, and business persons in implementing continuous improvements.

According to the Institute of Internal Auditors (IIA, 2010), internal audit plays a critical role in the governance and operation of organizations whereby those which they effectively use internal audit are better able to identify business risks, processes and system inefficiencies to take appropriate corrective action, and ultimately support continuous improvements. Internal audit is an important part of corporate governance structure within an organization which includes those oversight activities undertaken by the board of directors and audit committee to enhance the integrity of financial reporting process (Gamage et al., 2014).

For most of its history, internal audit has served as a simple administrative procedure comprised mainly of checking documents, counting assets, and reporting to board of directors, management or external auditors. In recent times, however, a combination of different forces has led to a quiet revolution of the profession (Filfilan, 2022; Shamki & Alhajri, 2017; Ta & Doan, 2022; Yelekal, 2018). Besides, internal audit is certainly considered as an independent profession, which is playing a significant role in the management of organizations by assessing the effectiveness of the internal control system and finding out whether the system is functioning as intended (Fadzil et al., 2005).

In recent years, the role of internal auditing in corporate governance has received increasing attention due to its links to the internal control-risk management system. Internal auditors have exploited this renewed interest by transforming their functions and extending their areas of involvement to risk management, control and governance processes. Such changes have had the aim of increasing the value added by internal audit to organizations. However, this change requires a redesigning of internal audit processes, competencies and roles (Arena & Azzone, 2009).

Although internal audit has become a crucial function within organizations, academic researchers have tended to focus on external audit as an organizational control function while ignoring internal audit (Gendron & Bedard, 2006). More specifically, internal audit effectiveness has not been extensively studied; to date, there has been relatively little researches conducted concerning internal audit effectiveness.

The literatures indicate that no generally accepted approaches to assess internal audit effectiveness exist as yet (Alemzewd, 2019; 2010; Fetu, 2016; Desalegn, 2010; Shewamene, 2014; Sisay, Yelekal, 2010). For this reason, the limited previous research which addresses the issue of internal audit effectiveness has used different approaches in studying internal audit effectiveness. Some of the researchers have related effectiveness of internal audit with level of management and their cultural tension in organizations (Yee, Sujan, James, & Leung, 2008), co-operation between internal auditors and external auditors, management support and organizational settings (Arena & Azzone, 2009), and proficiency, objectivity, performance and information technology (Wubishet & Dereje, 2014) indicating lack of consensus regarding the factors that affect the effectiveness of internal audit. Moreover, several academic studies (Desalegn & Aderajew, 2007; Yee et al., 2008; Arena & Azzone, 2009; Desalegn, 2010; Shewamene, 2014) have advocated further research and the need for a more comprehensive study on different settings of the issue of internal audit effectiveness. Hence, this study synthesizes previous research by examining various factors.

1.1. Statement of the problem

To the best of the researchers' knowledge, there is limited academic literature on internal audit effectiveness, especially in developing countries like Ethiopia, and there is no studies focusing on the area of manufacturing. Shewamene (2014) made a study focused on competence of internal audit team, independence of internal audit, management perception, organizational independence, and availability of internal auditing charter while Desalegn and Aderajew (2007) looked at internal audit quality, management support, organizational setting, and auditee attributes. Sisay (2010) highlighted independence, competency, management support and availability of information technology resources, and Yelekal (2018) emphasized organizational independence, management support, adequate and competent internal audit staff and availability of strong audit committee. Alemzewd (2019) analyzed internal audit quality, management support, independence of internal audit and competence of internal audit team. Despite common themes like Management Support, Competency, and Independence,

discrepancies remain, particularly internal audit departments' size and internal auditors' experience were overlooked.

Despite the recognized importance of internal audit effectiveness, prior research in the developing world, particularly in Ethiopia has often relied on simplistic quantitative methods, such as descriptive analyses or bivariate correlations, which do not adequately capture the complex, multidimensional nature of internal audit effectiveness or control for multiple determinants simultaneously. As a result, there is limited and inconclusive evidence on how factors influence internal audit effectiveness. To address this methodological gap, the present study employs mixed-methods approach combining ordered logit regression analysis to quantitatively assess the key determinants with qualitative content analysis to explore contextual factors that provides a more comprehensive and robust understanding of internal audit effectiveness. Therefore, this study addresses these gaps within Tigray's manufacturing sector.

1.2. Objectives of the Study

The general objective of this study is to examine factors determining internal audit effectiveness using empirical evidence from Large Manufacturing Companies in the Tigray region of Ethiopia.

Based on the above main objective, this study attempts to achieve the following specific objectives:

1. To analyze how the internal auditors' independence determines internal audit effectiveness;
2. To examine how the internal auditors' competency determines internal audit effectiveness;
3. To identify how management support determines internal audit effectiveness;
4. To elaborate how the presence of internal audit charter determines internal audit effectiveness;
5. To explain how the existence of audit committee determines internal audit effectiveness;
6. To explore how the internal auditors' experience determines internal audit effectiveness, and
7. To investigate how the size of internal audit department determines internal audit effectiveness.

1.3. Scope and Limitations of the Study

The results of the study would have been more representative if it had been conducted by including other sectors along with the manufacturing sector in the region. However, due to time and finance constraints, it has become out of the touch of the researchers. Thus, this study focused on the determinants of internal

audit effectiveness with special emphasis on large manufacturing companies in Tigray. Additionally, although the study used a mixed research approach, there are discrepancies between the quantitative and qualitative results regarding the significance of variables such as presence of approved internal audit charter, existence of audit committee, size of internal audit department, and internal auditors' experience which might be attributed to the methods of data collection employed. Finally, the study has not exhaustively included all the variables that could affect internal audit effectiveness due to contextual differences.

1.4. Significance of the Study

Due to the lack of internal audit research and the fact that the limited previous research on internal audit, this study focus mainly on developed countries. It provides empirical evidence from a developing country that may contribute additional insight to the literature and enhance understanding of the global configuration of the internal audit profession, particularly in Ethiopia where there have been relatively little research studies conducted regarding internal audit.

To sum up, the study could have contributions for multiple stakeholders. For manufacturing companies, it offers a strategy to enhance internal audit effectiveness and enable management to take corrective actions by identifying key factors. For policymakers and regulators, it provides insights to improve internal audit standards ensure higher quality and protect stakeholder interests. Finally, it lays the groundwork for future research in this field.

2. Literature Review and Hypothesis Development

According to Ministry of Finance and Economic Development (MoFED, 2004), internal audit is the mechanism through which information about the effectiveness of the quality system is gathered by auditors selected from within the company, mainly from independence of the area, function or procedure being audited. The internal audit function is the mechanism through which the operation of the quality management system is formally monitored and compliance of the documented quality system is assured. Internal auditing is formulated within the organization to increase the value of the organization by providing impartially assertion and consultancy service independently (Nteziryayo, 2014).

2.1. Internal Audit Effectiveness

The word effectiveness is defined by many authors, for example, Arena and Azzone (2009) define effectiveness as the ability to arrive at success, by answering the planned target, implying that organizations must reach their planned objectives to be effective.

According to Dittenhofer (2001), the word effectiveness refers to accomplishments of the

planned objective by using features and measures for influencing those features. Internal audit effectiveness is defined as the ability of internal audit department to arrive at their mission, or internal audit effectiveness is the ability of internal audit department to achieve the planned result (Desalegn & Aderajew, 2007). Although the above authors interpret effectiveness differently they reflect the same concept, which is achievement of intended objective. As stated by Desalegn and Aderajew (2007), for the internal audit unit to work well, it must offer fair assessments of all organizational matters. It should support achieving goals, evaluate financial and operating systems independently, gain management's commitment for changes, and suggest improvements as needed.

2.2. Internal Auditors' Independence and Internal Audit Effectiveness

According to Network of National Audit Experts (NNAE, 2004), independence is the freedom from conditions that threaten the ability of the internal audit activity to carry out internal audit responsibilities in an unbiased and impartial manner. To achieve the degree of independence necessary to effectively carry out the responsibilities of the internal audit activity, the chief audit executive (the person in charge) of the audit body has direct and unrestricted access to top management and the board.

To maintain the independence of the internal audit function from management, the reports should go directly to the audit committee. The committee needs to review the internal audit charter and plans. It is important that they thoroughly examine these reports to protect the objectivity and independence of the internal audit team (Sydney, 2017). Objectivity is an impartial habit by internal auditors to accomplish their audit work. Objectivity does not permit to internal auditors to support their decision on their work by others.

According to Hawa (2016), internal auditing effectiveness is highly dependent in internal auditor's independency and recommends that to ensure the shareholder's value organizations should able to maintain internal auditors objectively and independently.

Without independence, internal audit simply becomes a part of the management team, losing its ability to offer a fresh perspective (Yee et al., 2008). Cohen and Sayag (2010) also argue that organizational independence of internal audit affects internal audit effectiveness. Examining effectiveness of internal audit in Saudi Arabia by Alzeban and Gwilliam (2014) argue that independence of internal audit is positively and significantly associated with internal audit effectiveness. Ta and Doan (2022) and Filfilan (2022) also found similar results. In view of the

above discussions, the researchers developed the first hypothesis as follows:

H1: Internal auditors' independence has positive and significant impact on internal audit effectiveness.

2.3. Management Support and Internal Audit Effectiveness

Sarens and Beelde (2006) point out that internal audit plays a crucial role in organizations by addressing senior management's expectations. It compensates for management's reduced control due to growing complexity, safeguards corporate culture through direct interactions with field staff, and supports risk management and internal control system enhancement.

Desalegn and Aderajew (2007) argued that there is a positive and significant relationship between top management support and internal audit effectiveness. In line with the above study, Cohen and Sayag (2010) empirically reported that management support is considered as the main determinant of internal audit effectiveness. Similarly, Alzeban and Gwilliam (2014), and Ta and Doan (2022) indicated that management support is positively and significantly associated with internal audit effectiveness and is also positively associated with all the other variables affecting internal audit effectiveness. George, Theofanis, and Konstantinos (2015) argued that management support is positively associated with internal audit effectiveness. In light of the above arguments, the researchers developed the second hypothesis as follows:

H2: Management support has positive and significant impact on the internal audit effectiveness.

2.4. Internal Auditors' Competency and Internal Audit Effectiveness

According to the Institute of Internal Auditors (IIA, 2010), competency is the ability that enables the auditors to carry out their audit work. According to Mousa (2005) internal auditing effectiveness is highly dependent on proficiency and due professional care of the internal audit unit. Turley and Zaman (2007) argue that internal audit effectiveness is dependent on the communication among the members of the internal audit unit. Communication among the members of the internal audit unit has a significant positive effect on internal audit effectiveness.

Arena and Azzone (2009) have also empirically documented that the competency of the internal audit unit positively and significantly affects the internal audit effectiveness. Internal audit effectiveness is highly dependent on the technical competency of the internal audit staff, and continuous training provided to the internal audit unit (Desalegn, 2010). Cohen and Sayang (2010) found out that the professional proficiency is the main factor that affects to the internal audit effectiveness. The effectiveness of internal

auditing increases if there is an increase in the competency of the internal audit staff (Alzeban & Gwilliam, 2014). Similarly, Ta and Doan (2022) and Filfilan (2022) documented a positive and significant relationship between competency and internal audit effectiveness. Accordingly, the researchers developed the third hypothesis as follows:

H3: Internal auditors' competency has positive and significant impact on the internal audit effectiveness.

2.5. The Presence of Approved Internal Audit Charter and Internal Audit Effectiveness

Internal audit charter is defined by the Institute of Internal Auditors (IIA, 2001) as "a formal written document that defines the activities, purposes, authority and responsibilities of internal auditors. It also states that the charter should establish the internal audit activity's position within the organization, authorize access to records, personnel and physical properties relevant to the performance of management, and define the scope of internal audit activities".

Different authors have explained that the presence of audit charter in organizations helps auditors to be effective. For instance, Regan (2002) concludes that a well drafted charter is an important ingredient for the internal audit effectiveness, directing the efforts of audit staff and defines what the board can expect on the assurance it required on internal control from an internal audit.

Peusem (2005) found out that an approved internal audit charter serves as a framework to assess each organizational unit's contribution to achieving objectives. It aids top management in delegating responsibilities effectively. Consequently, the presence of this charter enhances internal audit effectiveness, positively impacting overall organizational performance.

Shewamene (2014) found that an approved internal audit charter enhances audit effectiveness in public offices by aligning auditors' roles and authority with established standards, thereby streamlining their activities and ensuring compliance with organizational rules and regulations. Based on these arguments, the researchers developed the fourth hypothesis as follows:

H4: The presence of approved internal audit charter has positive and significant impact on the internal audit effectiveness.

2.6. Existence of Audit Committee and Internal Audit Effectiveness

The existence of strong audit committee and effective internal audit and the foundation of good corporate governance have been increasingly recognized after the occurrence of financial collapse in different countries (Bedard & Gendron, 2010). Internal audit is a key component of corporate governance – the eyes

and ears of the board and its committees, above all the audit committee (IIA, 2010). Arena and Azzone (2009) described that whenever there is audit committee involvement in the internal audit activities, internal audit effectiveness would be enhanced. They point out that internal audit structural characteristics influences its effectiveness.

To sum up, the aforementioned studies show that availability of strong audit committee positively affects internal audit effectiveness. Besides, Institute of Internal Auditors (IIA, 2010) suggests that the audit committee should foster strong relationships and respect for internal audit, ensuring timely responses to audit findings, even when management controls are critically assessed, to support audit effectiveness. Accordingly, the researchers developed the fifth hypothesis as follows:

H5: Existence of audit committee has positive and significant impact on the internal audit effectiveness.

2.7. Internal Auditors' Experience and Internal Audit Effectiveness

Experience is an important factor that needs to be considered in the effectiveness of internal audit (Usmany, 2021). When an auditor has experience, it is an indication that the auditor knows more about the error, has more accurate knowledge of errors, and the cause of the error itself (Intakhan & Ussahawanitchakit, 2010 as cited in Usmany, 2021). When we compare the senior with the guest at any job, the senior one has the ability to perform successfully and quickly. Therefore, the auditor who stays in his/her job for a long period of time accumulates high experience, and as a result the auditor becomes best performer in his/her engagement (Simanjuntak, 2005 as cited in Usmany, 2021).

Experienced auditors outperform less experienced ones by efficiently processing information, evaluating alternatives, and taking effective actions (Chung & Monroe, 2000; Moyes, 2007). Auditing experience is strongly associated to the different levels of knowledge and skills that the auditor has acquired as a result of long job practice in auditing professions in a way that can enhance his effectiveness (Badara & Saidin, 2013).

Although audit experience plays an independent role, its relationship with audit effectiveness has not been well researched (Badara & Saidin, 2013). While auditor's experience represents one of the major topics in the area of auditing research and internal audit's critical dimensions, there is a need for the current study as well as the future ones to expand the research on audit staff experience (Intakhan & Ussahawanitchakit, 2010 as cited in Usmany, 2021; Seol, Sarkis, & Lefley, 2011). Furthermore, Shamki and Alhajri (2017) found that experience of internal auditors has a positive and significant

effect on internal audit effectiveness. Accordingly, the researchers developed the sixth hypothesis as follows:

H6: *Internal auditors' experience has positive and significant impact on the internal audit effectiveness.*

2.8. Size of the Internal Audit Department and Internal Audit Effectiveness

Research indicates that a larger internal audit department significantly enhances audit effectiveness, suggesting that having sufficient staff enables the department to deliver more effective auditing services. For example, Ali, Gloeck, Ahmi, and Sahdan (2007) found that the trouble of internal audit in most organization is they follow others' auditing progress without enough and sufficient internal audit staff.

If the internal audit department does not have enough number of internal auditors, the audit service provided by the department will not be satisfactory and reliable because the internal audit department needs sufficient internal auditors to perform its work effectively. Therefore, as a result the size of internal audit department has a significant positive effect to the effectiveness of internal audit (Al-Twaijry et al., 2003).

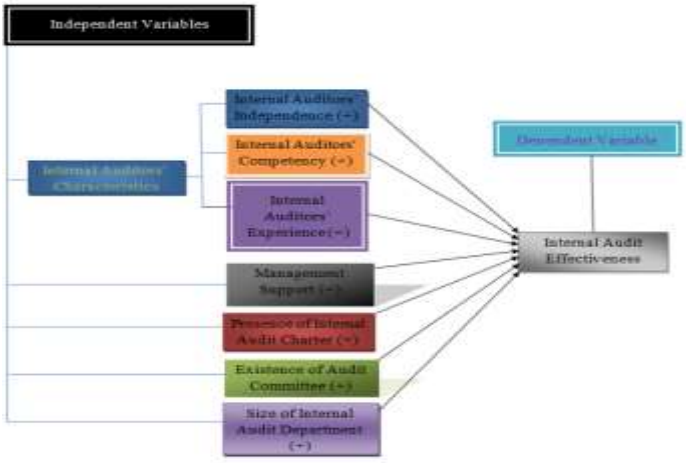
According to a study by Ahmad, Othman, and Jusoff (2009) in Malaysian governmental companies, insufficient number of internal auditors is the main reason for the internal audit to be ineffective. Mwangi (2017) and Shamki and Alhajri (2017) also found positive and significant relationship. Accordingly, the researchers developed the seventh hypothesis as follows:

H7: Size of internal audit department has positive and significant impact on the internal audit effectiveness.

Some researchers also examined the effectiveness of internal audit and its determinants by using other variables that are not included in this study. For instance, Desalegn and Aderajew (2007) used internal audit quality and Organizational Setting. However, Internal Audit Quality and Organizational Setting are reflected in organizational independence and availability of strong audit committee.

Figure 1

Conceptual Framework of the Study



Note. Authors' Derivation based on relevant literature

3. Materials and Methods

3.1. Research Approach, Sample Selection and Data Sources

The type of research design that was employed in this study is an explanatory cross-sectional research design with a mixed research approach of qualitative and quantitative in light of the objective of the study; the nature of the data collected, and time dimension. The explanatory type of research design helps to identify and evaluate the causal relationships between independent and dependent variables under consideration (Saunders et al., 2009). When a study is about to identify the effect of one variable over the other variable the research design that fits to such study is explanatory research (Yin, 1993). The mixed research approach recognizes the importance of traditional quantitative and qualitative research, which offers a powerful third paradigm choice that often will provide the most informative, complete, balanced, and useful research results (Johnson, Onwuegbuzie, & Turner, 2007).

The target population for this research was all the internal auditors and managers of large manufacturing companies engaged in all sub-sectors, which had been actively operating in the Tigray region before the war of 2020. According to the data gathered from Tigray Investment and Export Commission, large manufacturing companies are companies with an investment capital of over 20 million. Based on this criterion, there were 34 large manufacturing companies which had been actively operating in Tigray before the war began in November, 2020. Accordingly, there were 120 respondents from all the 34 companies.

According to Wubishet and Dereje (2014), there is no need to sample if the target population contains few elements. Thus, all internal auditors and managers (120 respondents) of the 34 large manufacturing companies in Tigray were taken in to consideration for the study.

To achieve the objective, the researchers used primary data collected via questionnaires and focus group discussions. Five-point Likert scale–based questionnaires, designed to show respondents' levels of agreement or disagreement—where the lowest scale represents "strongly disagree" and the highest scale represents "strongly agree"-were also distributed to internal auditors and managers. To complement the questionnaires, 58 internal auditors from the manufacturing companies were divided into 12 focus groups to explore factors influencing audit effectiveness. Focus group discussion was applied because this method is useful to gain new perspectives and in-depth knowledge about why and how people think about a subject of interest. Therefore, in this study, only primary source was employed as the

study was more dependent on company internal auditors and managers.

3.2. Measurement of Variables and Model Specifications

The study used internal audit effectiveness as a dependent variable which was measured based on a five-point Likert scale types (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). Thus, the dependent variable is an ordinal category. Accordingly, the regression model used for this study was ordered based on logit regression model.

The independent variables of the study are independence of internal auditors, management support, competency of internal auditors, the presence of internal audit charter, existence of audit committee, experience of internal auditors, and size of internal audit department. Like the dependent variable, all the independent variables were measured on a five-point Likert scale types. Most of the independent variables included in the model were extensively used in prior related literatures (Arena & Azzone, 2009; Cohen & Sayag, 2010; Filfilan, 2022; Shewamene, 2014: Ta & Doan, 2022; Yelekal, 2018; Wubishet & Dereje, 2014). But, in doing so, the researchers took into consideration the variables which were expected to be the most relevant and were usually found to influence the variation in internal effectiveness in the Ethiopian context and in view of the extant literature. The model for this research was formulated as follows:

$$\begin{aligned} logit[p(Y \le j)] &= \alpha_j + \beta_1(IAI) + \beta_2(MS) \\ &+ \beta_3(IAC) + \beta_4(AIAC) \\ &+ \beta_5(AC) + \beta_6(IAExp) \\ &+ \beta_7(SZIAD) \end{aligned}$$

Or using the cumulative probabilities form:

$$p(Y \le j) = \frac{e^z}{1 + e^z}$$

Where, $e^z = e^{\alpha_j+\beta_1(IAI)+\beta_2(MS)+\beta_3(IAC)+\beta_4(AIAC)+\beta_5(AC)+\beta_6(IAExp)+\beta_7(SZIAD)}$

$\boldsymbol{Logit}$ is the natural logarithm of the odds of event occurrence; $\boldsymbol{Y}$ is the dependent variable (Internal Audit Effectiveness); $\boldsymbol{p(Y \le j)}$ is the probabilities of the dependent variable being less than or equal to $\boldsymbol{j}$; $\boldsymbol{j}$ is the number of levels in the ordinal dependent variable; $\boldsymbol{\alpha_j}$ is the constant of the $\boldsymbol{j^{th}}$ level; $\boldsymbol{\beta_i}$ is the coefficient for the $\boldsymbol{i^{th}}$ independent variable; $\boldsymbol{IAI}$ is the Internal Auditors' Independence; $\boldsymbol{MS}$ is the Managements Support; $\boldsymbol{IAC}$ is the Internal Auditors' Competency; $\boldsymbol{AIAC}$ is the presence of Approved Internal Audit Charter; $\boldsymbol{AC}$ is the existence of Audit Committee; $\boldsymbol{IAExp}$ is the Internal Auditors' Experience; and $\boldsymbol{SZIAD}$ is the Size of Internal Auditors.

4. Result and Discussion

In the subsequent sections, regression analysis ordered logit model was used to examine the relationships between internal audit effectiveness and its determinants and to test the

hypothesis thereon. The Statistical Package for Social Sciences (SPSS) software was used for the data analysis.

Besides, content analysis was applied to analyze the qualitative data from the focus group discussions as a support to the regression analysis. The researchers' notes based on the transcribed contents of 12 semi-structured focus group discussions were used for the analysis. Content analysis involves extracting, reinterpreting, and inferring significant implicit meanings embedded in original data by using established theories or perspectives. The series of semi-structured focus group discussions were carried out based on a question guide developed by the research team based on the relevant literature related to the area.

4.1. Survey Distribution and Response Rates

The study was based on a survey of 120 respondents. A total of 120 questionnaires were distributed to respondents. At the end of the fieldwork, 114 usable questionnaires were retrieved, representing a response rate of 95% and all were used in the analysis.

4.2. Reliability Analysis

To measure the consistency and reliability of a questionnaire particularly the Likert-scale questionnaire, reliability analysis is necessary to reflect the whole reliability of constructs that it is measuring. To do the reliability analysis, Cronbach's Alpha (α) is the most common measure of scale reliability. A value greater than 0.7 is very acceptable (Field, 2009; Cohen & Sayag 2010). While many authors cite Cronbach's $\alpha \geq 0.70$ as a rule-of-thumb for acceptable internal consistency, the audit-effectiveness literature includes studies where α values in the range 0.60–0.70 are considered acceptable—for example Filfilan (2022) found $\alpha = 0.654$ for a key construct and judged it acceptable, and many other studies (Endaya, & Hanefah, 2016; Ta & Doan, 2022; Lonto, Sukoharsono, Baridwan, & Prihatiningtias, 2023; Hazaea, Al-Matari, Omer, Farhan, & Zhu, 2024) accepted scales with in this range, mostly in emerging-market internal audit research context. This study employs constructs adapted to a new context (manufacturing sector in Ethiopia); hence, consistent with the aforementioned studies, $\alpha > 0.6$ is considered acceptable.

Table 1

Reliability Statistics

Variable	No. of items	Cronbach's Alpha
IAE	4	0.628
IAI	5	0.702
MS	6	0.699
IAC	5	0.747
AIAC	5	0.772
AC	5	0.723
IAExp	4	0.696
SZIAD	5	0.659

Note. Internal Audit Effectiveness (IAE), Internal Auditors' Independence (IAI), Management Support (MS), Internal Auditors' Competency

(IAC), Approved Internal Audit Charter (AIAC), Audit Committee (AC), Internal Auditors' Experience (IAExp), and Size of Internal Audit Department (SZIAD). All of the study's variables are measured on a five point Likeret scale types (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree).

As shown in **Table 1**, the value for Cronbach's Alpha (α) of each variable is above the minimum criterion (0.6). This implies that responses generated for the variables used in this research were reliable enough for data analysis.

4.3. Correlation Analysis

The correlation between two variables measures the degree of linear association between them (Brooks, 2008). Accordingly, correlation analysis provides a linear relationship between the

dependent variable and the explanatory variables using a correlation matrix. The analysis of the relationship between the dependent variable, Internal Audit Effectiveness (AE) and independent variables (IAI, MS, IAC, AIAC, AC, IAExp, and SZIAD) using Spearman Correlation is given in **Table 2**.

Table 2

Spearman's Correlation

			IAE	***IAI***	***MS***	***IAC***	***AIAC***	***AC***	***IAExp***	***SZIAD***
Spearman's rho	IAE	Correlation Coefficient	1.000	.491**	.378**	.399**	.137	.145	.194*	.279**
		Sig. (2-tailed)	.	.000	.000	.000	.146	.123	.038	.003
		N	114	114	114	114	114	114	114	114
	IAI	Correlation Coefficient	.491**	1.000	.376**	.444**	.072	.172	.248**	.378**
		Sig. (2-tailed)	.000	.	.000	.000	.445	.067	.008	.000
		N	114	114	114	114	114	114	114	114
	MS	Correlation Coefficient	.378**	.376**	1.000	.147	.133	.049	.148	.291**
		Sig. (2-tailed)	.000	.000	.	.118	.159	.607	.115	.002
		N	114	114	114	114	114	114	114	114
	IAC	Correlation Coefficient	.399**	.444**	.147	1.000	.070	.166	.278**	.340**
		Sig. (2-tailed)	.000	.000	.118	.	.461	.077	.003	.000
		N	114	114	114	114	114	114	114	114
	AIAC	Correlation Coefficient	.137	.072	.133	.070	1.000	.393**	.027	.039
		Sig. (2-tailed)	.146	.445	.159	.461	.	.000	.774	.677
		N	114	114	114	114	114	114	114	114
	AC	Correlation Coefficient	.145	.172	.049	.166	.393**	1.000	.149	.206*
		Sig. (2-tailed)	.123	.067	.607	.077	.000	.	.113	.028
		N	114	114	114	114	114	114	114	114
	IAExp	Correlation Coefficient	.194*	.248**	.148	.278**	.027	.149	1.000	.328**
		Sig. (2-tailed)	.038	.008	.115	.003	.774	.113	.	.000
		N	114	114	114	114	114	114	114	114
	SZIAD	Correlation Coefficient	.279**	.378**	.291**	.340**	.039	.206*	.328**	1.000
		Sig. (2-tailed)	.003	.000	.002	.000	.677	.028	.000	.
		N	114	114	114	114	114	114	114	114

The correlation matrix in table 2 shows that Internal Auditors' Independence (IAI), Management Support (MS), Internal Auditors' Competency (IAC), and Size of Internal Audit Department (SZIAD) have a positive relationship with Internal Audit Effectiveness (IAE) and are significant even at 1% level. Additionally, Internal Auditors' Experience (IAExp) has a positive

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed) relationship with IAE and is significant at 5% level. On the other hand, existence of Approved Internal Audit Charter (AIAC) and existence of Audit Committee (AC) have a positive relationship with IAE, but insignificant even at 5% level.

From the relationship explained above, it can be inferred that most of the independent variables have a significant relationship with the dependent variable implying that they can explain the dependent variable to a considerable degree. Moreover, it can be inferred from the correlation matrix in table 2 that the degree of correlation among the independent variables is not strong, which means there are no multi-collinearity problems, which will be discussed in detail in the following section.

4.4. Model Diagnostic Tests

4.4.1. Multicollinearity Test

One important step in ordinal logistic regression model is determining whether there exists multicollinearity among independent predictors. Multicollinearity occurs when two or more explanatory variables are highly correlated with each other. Variance Inflation Factor (VIF) was used to detect whether there exists multicollinearity problem, which is provided below.

Table 3

Multicollinearity Test

Variable	Collinearity Statistics	
	Tolerance	VIF
IAI	.647	1.545
MS	.717	1.395
IAC	.687	1.455
AIAC	.859	1.165
AC	.842	1.187
IAExp	.782	1.279
SZIAD	.635	1.575

As **Table 3** shows, the variance inflation factor (VIF) for all independent variables was less than 10 and the tolerance value was above 10%. Therefore, it can be concluded that there is no multicollinearity problem between the independent variables in the model.

4.4.2. Fitness of the Model

It has become very important to determine whether the model improves the predicting ability of the outcome before evaluating the effect of each explanatory variable in the model. The statistically significant chi-square statistic ($p<0.05$) shown in table 4 indicates that the final

model gives a significant improvement over the baseline intercept only model.

Table 4

Fitness of the Model Test

Model Fitting Information				
Model	**-2 Log Likelihood**	**Chi-Square**	**Df**	**Sig.**
Intercept Only	413.658			
Final	369.381	44.277	7	.000

As shown in **Table 4**, the likelihood ratio chi-square of 44.277 with a p-value < 0.05 indicates that parameters included in the model do give better predictions as compared to the null model with no predictors. This shows the overall importance of the explanatory variables.

4.4.3. Parallel lines assumption

The null hypothesis of the parallel lines assumption states that the location parameters (slope coefficients) are the same across response categories.

Table 5

Test of Parallel Lines

Model	***-2 Log Likelihood***	***Chi-Square***	***Df***	***Sig.***
Ho	369.381			
General	311.169	58.212	56	.394

Note. Ho: null hypothesis

As it can be seen from **Table 5**, the likelihood ratio chi-square for the parallel line assumption test is 58.212, with a p-value of 0.394. Because the probability value of the chi-square test is greater than 5%, we reject the alternative hypothesis and confirm that the parameters are the same across different response categories. Therefore, the parallel lines assumption is not violated, and the use of ordinal logistic regression is appropriate.

4.4.4. Pseudo R-square

According to Hasher, Rose, and Green (2005), the criterion for best fit model values of Pseudo R^2 between 0.2 and 0.4 are considered to be good fits.

Table 6

Pseudo R-square

Cox and Snell	.322
Nagelkerke	.331
McFadden	.107

As shown in **Table 6**, the Pseudo R^2 value obtained was 0.331 (the Nagelkerke's value) which implies the rejection of the null hypothesis that all the coefficients in the model are equal to zero. As the value lies within the criterion range, the fit of the model was found to be worthy.

4.5. Ordered Logit Regression Analysis

Results of the ordered logit regression model based on SPSS software package are presented in Table 7. The results shown in table 8 were used for the analysis and interpretation of results against the formulated hypotheses. The hypotheses were hypothesized to test whether internal auditors' independence, internal auditors' competency, existence of approved internal audit charter, management support, size of the internal audit department, existence of audit committee, and internal auditors' experience determine internal audit

effectiveness. Hence, the analysis and interpretation of results against the formulated hypotheses are discussed below.

Table 7

Ordered Logit Model Regression Results

		Estimate	Std. Error	Wald	Sig.	95% CI		Odds Ratio
						LL	UL	
Threshold	[IAE = 2.50]	12.634	2.917	18.759	.000	6.917	18.352	306883.532
	[IAE = 3.00]	13.961	2.923	22.815	.000	8.232	19.689	1156195.028
	[IAE = 3.25]	14.951	2.970	25.339	.000	9.130	20.772	3112407.605
	[IAE= 3.50]	15.705	3.002	27.371	.000	9.822	21.589	6619214.530
	[IAE= 3.75]	16.964	3.050	30.931	.000	10.985	22.942	23290206.761
	[IAE = 4.00]	19.043	3.143	36.698	.000	12.882	25.204	186276864.217
	[IAE = 4.25]	20.301	3.192	40.453	.000	14.045	26.557	655528103.645
	[IAE = 4.50]	21.457	3.228	44.188	.000	15.130	27.783	2082300926.460
	[IAE = 4.75]	22.974	3.297	48.542	.000	16.511	29.437	9493352768.130
Variable	IAI	1.274	.518	6.059	.014	.260	2.289	3.576
	MS	1.291	.486	7.043	.008	.337	2.244	3.636
	IAC	1.372	.493	7.752	.005	.406	2.337	3.941
	AIAC	.122	.378	.104	.748	-.619	.863	1.129
	AC	.112	.395	.081	.777	-.661	.885	1.119
	IAExp	.106	.419	.064	.801	-.716	.927	1.111
	SZIAD	.095	.517	.034	.854	-.918	1.109	1.100

Note. LL= Lower limit, UL= Lower limit, Sig. = Significant, and CI= confidence interval

The regression results of the ordered logit model shown in table 7 indicate that Internal Auditors' Independence (IAI) has a positive relationship with internal audit effectiveness and is significant (p-value = 0.014) at 5% level of significance. Therefore, the result supports the alternative hypothesis that as internal auditors' independence increases, internal audit effectiveness increases. Other factors held constant, the odds of being on a higher level on effectiveness of internal audit increases by 3.58 for every one-unit increase on Internal Auditors' Independence. This result is consistent with previous studies like Hawa (2016) who argued that internal auditing effectiveness is highly dependent in internal auditor's independency and Yee et al. (2008) who stated that without independence, internal audit simply becomes a part of the management team, losing its ability to offer a fresh perspective. In addition to this, this result is in line with studies such as Cohen and Sayag (2010), and Alzeban and Gwilliam (2014) who found that independence of internal audit is positively and significantly associated with internal audit effectiveness.

Similarly, focus group participants agreed that internal auditors' independence strongly influences audit effectiveness. They noted that independence ensures thorough, high-quality findings, while impaired independence undermines credibility, weakens recommendations, limits risk identification, and hinders organizational improvement. They emphasized that lack of independence creates

barriers to conducting objective, reliable, and effective audits.

Consistent with the hypothesis of the study, the regression results in table 7 show that Management Support (MS) has a positive and significant effect on the effectiveness of internal audit even at 1% level of significance. As shown in the model output provided in table 7, the coefficient of management support is positive (coefficient = 1.29) and significant (p-value = 0.008). Other factors held constant, the odds of being on a higher level on effectiveness of internal audit increases by 3.64 for every one-unit increase on management support. This result is consistent with previous studies (Desalegn & Aderajew, 2007; Cohen & Sayag, 2010; Alzeban & Gwilliam, 2014; Sehewamane, 2014; George et al., 2015; Amanuel, 2017; Alemzewd, 2019) which found and reported that management support has a positive and significant relationship with effectiveness of internal audit.

Most focus group participants agreed that management's understanding and support significantly influence internal audit effectiveness. They highlighted that top management's commitment enhances resource allocation, investment guidance, trust, collaboration, and performance. Furthermore, valuing and prioritizing internal audit fosters accountability, builds a positive organizational culture, and eases access to resources and cooperation across divisions.

The regression results shown in table 7 indicate that Internal Auditors' Competency (IAC) has a positive (coefficient=1.37) and significant (p-value = 0.005) impact on internal audit effectiveness even at 1% level of significance. Therefore, it supports the formulated hypothesis. Other factors held constant, the odds of being on a higher level on effectiveness of internal audit increases by 3.94 for every one-unit increase on internal auditors' competency. This result is consistent with previous studies (Mousa, 2005; Turley & Zaman, 2007; Alzeban & Gwilliam, 2014; George et al., 2015) which found that there is a positive and significant relationship between internal auditor's competency and effectiveness of internal audit. Besides, it supports the idea that internal audit effectiveness is highly dependent on the technical competency of the internal audit staff, and continuous training provided to the internal audit unit (Desalegn, 2010). On the other hand, this study refutes some earlier studies like Arena and Azone (2009), and Cohen and Sayag (2010) who argued that presence of adequate and competent internal audit staff has no effect on internal audit effectiveness.

The qualitative findings reveal that auditor competency directly influences audit quality and is vital for effective internal audit performance.

Participants emphasized the need for continuous professional development through training programs, enabling auditors to adapt to evolving methodologies and address emerging risks, thereby strengthening audit effectiveness and organizational resilience.

As the regression results in table 7 reveal, the presence of Approved Internal Audit Charter (AIAC) has a positive (coefficient = 0.122) but not significant (p-value = 0.748) impact on internal audit effectiveness at 5% level of significance. Accordingly, it doesn't support the formulated hypothesis. This result is inconsistent with previous studies like Shewamene (2014) who found that the existence of approved internal audit charter positively and significantly contributes for the effectiveness of internal audit works by facilitating the activities of internal auditors and Fetu (2016) who reported that approved internal audit charter was a significant contributor for the internal audit effectiveness. Besides, it doesn't support the idea by Peursem (2005) who stated that the existence of approved internal audit charter is a frame work for measuring the contribution of each organ of the organization to the effective accomplishment of the intended objective and Regan (2002) who concluded that a well drafted charter is an important ingredient for the internal audit effectiveness.

On the other hand, the qualitative results indicate that an approved internal audit charter greatly enhances audit effectiveness by clarifying roles, aligning activities with organizational goals, establishing authority, reinforcing legitimacy, and ensuring industry compliance. This divergence might be attributed to the variation in the responses obtained from the participants and/ respondents because of the use of two different data collection methods.

At the 5% level of significance, the regression results in table 7 indicate that existence of Audit Committee (AC) has a positive (coefficient = 0.112) but not significant (p-value = 0.777) impact on internal audit effectiveness. Accordingly, the result doesn't support the hypothesis. This result is inconsistent with previous studies such as Zhang et al (2007), and Wondwosen (2019) in which they found that existence of audit committee has a positive and significant relationship with internal audit effectiveness. Besides, it doesn't support the argument by Arena and Azzone (2009) who stated that whenever there is audit committee involvement in the internal audit activities, internal audit effectiveness would be enhanced. Furthermore, it is not in line with a study by Bedard and Gendron (2010) who stated that the existence of strong audit committee and effective internal audit and the foundation of good corporate governance have been increasingly recognized

after the occurrence of financial collapse in different countries.

Conversely, the qualitative findings reveal that audit committees positively influence internal audit effectiveness by safeguarding independence and objectivity, strengthening the credibility of findings, facilitating discussions on audit issues, and offering constructive feedback to audit management. This non-convergence may result from variations in participants' responses, likely arising from the use of two different data collection methods.

At 5% level of significance, the regression results in table 7 show that Internal Auditors' Experience (IAExp) has a positive (coefficient = 0.106) and statistically insignificant (p-value = 0.801) impact on internal audit effectiveness. Accordingly, it doesn't support the hypothesis. This result is inconsistent with a study done by Shamki and Alhajri (2017) who found that experience of internal auditors has a positive and significant effect on internal audit effectiveness. Besides, this result is not consistent with Simanjuntak (2005) as cited in Usmany (2021) who argued that the auditor who stays in his/her job for a long period of time accumulates high experience; as a result, the auditor becomes best performer in his/her engagement.

The qualitative findings obtained from focus group participants reveals that experienced internal auditors significantly enhance audit effectiveness compared to their inexperienced counterparts. Their extensive practice fosters deep knowledge and insight, enabling them to mentor newcomers effectively. Participants emphasized that experience enhances auditors' ability to detect non-conformities, assess organizational impacts, analyze data, ask relevant questions, give practical recommendations, and identify recurring patterns of non-compliance and areas needing improvement, thereby strengthening overall audit quality and effectiveness.

Finally, it was found that size of Internal Audit Department (SZIAD) has a positive (coefficient = 0.095) and statistically insignificant (p-value = 0.861) impact on internal audit effectiveness at 5% level of significance as shown in table 7. Accordingly, it doesn't support the formulated hypothesis. This result is inconsistent with previous studies (Desalegn & Getachew, 2008; Ahmed et al., 2009; Shamki & Alhajri, 2017; Mwangi, 2017) who found positive and significant relationship between internal audit effectiveness and size of internal auditors. Besides, it doesn't support the argument stated by Ahmad et al. (2009) such that insufficient number of internal auditors is the main reason for the internal audit to be ineffective.

The qualitative findings show that sufficient internal audit staffing strongly enhances effectiveness by improving efficiency, boosting

job satisfaction and reducing turnover, ensuring timely reporting for meeting deadlines, enabling deeper analysis of complex processes to uncover hidden issues, and facilitating proactive risk management, thereby strengthening overall audit performance and organizational resilience.

Although correlation analysis indicated significant associations between size of internal audit department and internal auditors' experience with internal audit effectiveness, the ordered logit regression coefficients were not statistically significant. Significant correlation does not guarantee significant regression coefficients and thus, it's normal and scientifically explainable. This discrepancy likely reflects the simultaneous inclusion of multiple predictors in the regression, which can reduce the apparent effect of individual variables, as well as limited sample size per outcome category. These results suggest that while these factors are related to internal audit effectiveness in a bivariate sense, their independent effects are not robust when considered together. Practically, this implies that organizations should consider the combined influence of multiple determinants rather than relying on any single factor to enhance internal audit effectiveness.

5. Conclusion

In recent years, the role of internal auditing in corporate governance has received increasing attention due to its links to the internal control-risk management system. Additionally, academic researchers have tended to focus on external audit as an organizational control function, while internal audit and its effectiveness has not been extensively studied yet.

Furthermore, Ethiopia's manufacturing industry is among the key productive sectors given precedence by the government owing to its capacity to stimulate economic growth and development due to its enormous potentials for wealth creation, job creation, and poverty reduction. Therefore, the purpose of this study is to examine factors determining internal audit effectiveness in the case of large manufacturing companies in the Tigray region of Ethiopia.

The study identified that internal auditors' independence, management support, and internal auditors' competency have a positive and statistically significant impact on the internal audit effectiveness of large manufacturing companies in Tigray, Ethiopia. This finding is similar to numerous related studies carried out in several countries. However, discrepancies exist between the quantitative and quantitative findings regarding the presence of approved internal audit charter, existence of audit committee, internal auditors' experience, and size of internal audit department in the context of large manufacturing companies in Tigray. These may arise from the varying levels of awareness and commitment to audit governance

structures across different organizations, such as the presence of an audit committee or an established audit charter. Such discrepancies may also be influenced by the diverse experience levels of internal auditors and the varying sizes of internal audit departments.

Therefore, the study concludes that the internal audit effectiveness of manufacturing companies in the Tigray region of Ethiopia is significantly determined by internal auditors' independence, internal auditors' competency, and the top management support given to the internal audit function.

The results of this paper could have important implications for policymakers and regulators seeking to strengthen internal audit standards and practices. This can be achieved by ensuring that internal audits are carried out in accordance with applicable regulations and standards. Besides, audit documents are updated regularly, and any changes to processes or policies are properly documented. They should also ensure that internal auditors are informed about new internal audit laws, regulations, and guidelines to maintain compliance and uphold the highest professional standards.

Furthermore, the findings have implications for corporate leaders who aim to enhance operational efficiency and improve internal control systems within the manufacturing sector. They should prioritize and foster a culture that values the independence of internal auditors by establishing clear policies, providing appropriate training, and granting unrestricted access to all relevant information and records. Regular monitoring and evaluation should also be conducted to assess internal audit activities and address potential threats to independence. Furthermore, corporate leaders should facilitate internal audit work by recruiting qualified and competent auditors, and investing in the professional development of internal audit staff through continuous training and development programs. Finally, top management should ensure that adequate resources are provided to the internal audit function to enable it to effectively fulfill its responsibilities and support the professional growth of internal audit personnel.

Conflict of Interest Statement

The authors declare no competing interests.

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