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Factors Affecting Air Cargo Export Trade: Insights based on the perception of employees in Ethiopian International Air Cargo Service.

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ADDIS ABABA UNIVERSITY

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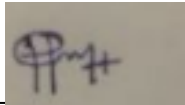
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Addis Ababa

DECLARATIONS

The Researchers hereby declare that the research paper titled “**Factors Affecting Air Cargo Export Trade: Insights based on the perception of employees in Ethiopian International Air Cargo Service.**” Is entirely original research that has not been produced by anyone else for any kind of requirement at any other institution or university. To that end, I hereby give due credit to all the information sources I consulted in order to properly produce the study.

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June 14,2024

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Abbreviation and Acronyms

AAACC:	Addis Ababa Airport Customs Commission
ACT:	Air Cargo Transport
AFRAA:	African Airlines Association
ASYCUDA:	Automated System for Customs Data
ATAG:	Air Transport Action Group
BOAC:	British Overseas Airways Corporation
CA:	Clearing Agent
CC:	Customs Commission
DHL:	DalseyHil Iblom and Lynn
EAL:	Ethiopian Airlines
EX:	Export
GDP:	Gross Domestic Product
GVC:	Global Value Chain
IATA:	International Air Transport Association
ICAO:	International Civil Aviation Organization
ITC:	International Trade Centre
MRO:	Maintenance Repair and Overhaul
NISS:	National information security service
UPS:	United Parcel Service

Abstract

This thesis investigates the challenges and opportunities within the air cargo trade, focusing on insights gathered from employees in Ethiopian international air cargo services. A comprehensive analysis of the current industry landscape revealed several key issues: insufficient focus on cargo infrastructure development, inadequate stakeholder collaboration, inefficiencies in ground handling processes, the need for research and innovation, and challenges in customs clearance procedures. Based on these findings, recommendations are proposed to enhance export cargo performance. These include prioritizing cargo infrastructure development, improving stakeholder collaboration, enhancing ground handling efficiency through technological integration and training, fostering research and innovation initiatives, streamlining customs clearance processes, and ensuring prompt implementation of improvement measures. Implementing these recommendations is expected to lead to improved efficiency, increased throughput, and enhanced global competitiveness for Ethiopia's air cargo industry.

Keywords: air cargo, infrastructure, customs clearance, ground handling, export trade.

CHAPTER ONE

1 INTRODUCTION

This section comprises the background of the study, problem statement, research objectives, research questions, scope and significance of the study, description of the study area, definitions of terms and organization of the thesis.

1.1 Background of the Study

The air cargo industry experienced significant growth during World War II as innovations in aviation technology enabled large-scale freight transport to support military operations. One notable example was the extensive cargo flights conducted between India and China from 1942-1945, known as "The Hump" operation. Over these three years, allied forces transported more than 650,000 metric tons of crucial supplies to Nationalist Chinese forces battling the Japanese in southern China (Naylor, 2014).

Another major logistical achievement in aviation history was the Berlin Airlift of 1948-1949. When Soviet forces blockaded ground access to West Berlin, the United States and its allies staged one of the largest relief operations ever, relying heavily on aircraft to deliver food and fuel to the isolated city. Over the 15 months, the airlift flew in over 2 million tons of cargo on over 200,000 flights (Senguttuvan, 2006).

This early period established air cargo as a vital component of modern commerce and ushered in rapid advancement in dedicated freighter aircraft design. By 2012, there were 1,738 freighters in service globally according to data from the International Civil Aviation Organization (ICAO). Large wide-body jets comprising two aisles and capable of carrying over 80 tons made up 37% of the fleet. Medium wide-body aircraft with a capacity of 40-80 tons accounted for 36%, while smaller single-aisle freighters under 45 tons represented 27% (Burgan, 2008).

Boeing, a leading manufacturer of commercial jets, projected strong continued demand through 2031. Their market forecast predicted the global freighter fleet would require expansion to 3,200 total aircraft to meet rising needs (Boeing, 2012). Growth in air cargo

traffic accelerated dramatically in the late 1980s and 1990s, averaging 7.1% annual increases between 1987 and 1997 (Boeing, 2012).

However, events of the early 2000s disrupted the industry's momentum. First, the terrorist attacks of September 11, 2001, drove up costs associated with tighter aviation security protocols. This contributed to air cargo's slowing expansion to a 4.1% yearly rate (Wensveen, 2016). At the same time, jet fuel prices climbed significantly, increasing the costs of air transport relative to marine and surface transportation alternatives (Wensveen, 2016).

The global financial crisis beginning in 2008 further impacted air cargo carriers. With heavy debt obligations from new aircraft purchases and high operating expenses, some all-cargo airlines faced bankruptcy due to falling revenues during the economic downturn (Blomberg & Gras Alomá, 2015). The aviation industry is highly correlated to trends in international trade and gross domestic product, leaving it vulnerable to downturns that reduce demand (Button & Stough, 2000).

In Africa, air cargo accounted for just 1 million metric tons or approximately 1.6% of the world total in 2002 according to the Airports Council International (ACI, 2003). Intra-African trading volumes were shallow, with only 66,000 metric tons transported between African nations during 2001 - equivalent to a meager 6.4% share of the continent's air freight market (Boeing, 2002). Underdeveloped infrastructure and inefficient networks inhibited the growth of trade by air within the region (Forecasting, 2003).

However, some African countries stood out as leaders. Kenya hosted over 1,500 international cargo flight arrivals and departures in 2001 to rank highest on the continent. Other top markets included South Africa with 1,333 flights, and Senegal with 1,248 (Bassens, Derudder, Otiso, Storme & Witlox, 2012; Senguttuvan, 2006). Nevertheless, air cargo prominence remained highly concentrated, as the busiest five nations comprised over 70% of Africa's total air freight volumes (Senguttuvan, 2006).

Generally, while the air cargo segment has largely expanded since the 1940s due to war demands and peacetime commercial applications, ongoing challenges include economic uncertainty, fuel price volatility, and security regulations that tighten operating margins.

For carriers to achieve sustained profitability, careful financial management will remain paramount to weather future disruptions to trade. Continued globalization and trade liberalization could further stimulate growth, supporting additional freighter aircraft procurement in the decades ahead.

1.2 Statement of the Problem

Air transport plays a vital role in connecting countries through international passenger and freight networks. An efficient aviation system enhances economic competitiveness by facilitating access to global markets and promoting regional integration. It also supports labour mobility and tourism industries. In 2015 alone, nearly 3.6 billion passengers travelled on worldwide airline routes.

The aviation industry generates significant employment, supporting nearly 63 million jobs globally through both direct operations and indirect tourism spending. Of these, 9.9 million people work directly for airlines and airport services. While air cargo volume only represents around 0.5% of total global trade shipments due to weight limitations, its value share is over 35% as air transport is suited for high-value perishable goods requiring fast delivery (ATAG, 2015).

Freight can be carried on dedicated cargo planes or in the belly holds of passenger aircraft. Boeing estimates nearly 60% of worldwide air cargo, by tonnage, is transported on passenger jets. This integrated business model requires close collaborations between airlines, freight forwarders acting as intermediaries, and agents who facilitate customer bookings (Belavina & Girotra, 2012).

Countries especially benefit from air connectivity when landlocked, remote, or low in population density. However, sufficient cargo volumes are needed to attract frequent, affordable dedicated freighter services. While permitting open competition or "open skies" for cargo flights promotes access, intra-African routes face obstacles as most shipments consist of small consignments transported on passenger aircraft (Mario Pierobon, 2017).

Challenges within Africa include unreliable ground handling infrastructure throughout the continent, complicating airline operations. Cross-border delivery difficulties to

landlocked nations also hinder trade, as circumventing direct routes via Middle Eastern hubs can prove cheaper. Though investments are improving conditions, these factors have historically constrained cargo growth (Mario Pierobon, 2017).

Ethiopia exemplifies air cargo's contribution as a landlocked country. Addis Ababa Bole International Airport serves as East Africa's main aviation hub through Ethiopian Airlines, transporting two-thirds of the region's freight capacity on extended-range aircraft. This facilitates increasing exports of perishable goods, textiles, electronics and cut flowers, supporting value-added production and employment nationally (IATA, 2015).

However, Ethiopia's air cargo exports face challenges such as airport infrastructure bottlenecks limiting expansion. Cargo declaration delays at customs also threaten on-time delivery schedules and foreign exchange earnings if shipments miss transfer connections. Additional operational uncertainties from capacity management and route availability further increase unpredictability for forwarders (Feng et al., 2015; Mongeau & Bes, 2003). While little prior academic research examines these issues specifically in Ethiopia, such studies could help address cargo export delays and sudden offloads that impact exports.

1.3 Research Questions

1. What is the current state of air cargo infrastructure in Ethiopian cargo?
2. How do customs clearance procedures impact air cargo export efficiency?
3. What is the impact of ground handling processes on air cargo export trade performance?
4. How does uncertainty affect air cargo export trade performance?

1.4 Objective of the Study

1.4.1 General Objective

The general objective of this Research is to investigate the Factors Affecting Air Cargo Export Trade: Insights based on the perception of employees in Ethiopian International Air Cargo Service.

1.4.2 Specific Objectives

1. To analyse the existing infrastructure facility in Ethiopian international cargo.
2. To examine how customs clearance procedure, affect cargo export performance
3. To examine the influence of ground handling process on air cargo export performance
4. To investigate how uncertainties, affect air cargo export performance

1.5 Scope of the Study

Air cargo export performance can be impacted by different variables; however, this study only concentrates on the determinant factors of infrastructure facilities, customs clearance procedure, ground handling process and uncertainties in the case of Ethiopian international air freight. Primary data will be gathered from clearing agents of exporters of Ethiopian cargo and Addis Ababa Bole international Airport is considered as the geographical boundary or limitation. While conducting this paper, a non-random (Deliberate or purposeful) and random sampling approach will apply in contacting intended respondents for the research. The study has been carried out between January 2023 to 2024. Reasons for selecting this topic, first, the researcher already has prior knowledge of the topic area. Secondly, it can save time since the researcher already has access to research participants or literature that is required. Additionally, the researcher aspires to focus on this research topic to identify a gap in the study field.

1.6 Significance of the Study

The outcomes of this thesis will have several importances. The research can assist the company in paying attention to gaps when delivering services and give special focus to air cargos to solve the factors recognized by the findings of the thesis. The company will also gain some ideas on how to develop and enact effective and efficient measures for its

major factors. This may also provide a clue to discuss with stakeholders to enhance its export trade performance. Additionally, it could alleviate the burden of the company by creating awareness about all air cargo export services. Furthermore, the paper serves as an advantageous point for those wanting to conduct research on the same issue. Finally, this study will address the problems of air cargo export trade and demonstrates a way to take measures based on the researcher's recommendations.

1.7 Limitation of the Study

This study tries to see the factors and constraints in air cargo export trade in the country in terms of its performance and how it affects the country export service, it is acknowledged that this study has some limitations. The major limitations of this study will as follows:

This research doesn't incorporate all the volume of cargo exports made by each private and governmental companies of a country since acquiring a well-organized data is very difficult. In addition, the factors of import goods will also not assessed as the major problems of the Ethiopian international cargo due to financial constraint and difficulties to address the problem.

Moreover, the study will base on available information from secondary and primary sources. Accuracy of the study depends on provided information but adequate attention will give to reliability and validity of the research by persuading respondents about the importance of their response on the validity of this work and through crosschecking different literatures together with purposive observations.

1.8 Definitions of Key Terms

- ⇒ **Air cargo:** by plane is a crucial component of international logistics networks. Air cargo is especially useful for companies shipping time-sensitive goods or goods over large distances. Air cargo is usually transported using dedicated cargo aircraft (freighters) or passenger aircraft (Joelynych, 2018).
- ⇒ **Delay:** A disruption in the shipping of goods, either requested by the customer or due to uncontrollable circumstances.
- ⇒ **Export trade:** the area of business or industry concerned with the export of goods or services (Collins dictionary)
- ⇒ **General cargo:** can be transported packed or unpacked, loose or consolidated and shipped by any means of transport.
- ⇒ **Special cargo:** Cargo that requires special handling or protection, such as fruits, marine products

1.8 Organization of the Study

This study was organized into five chapters; the first chapter concerned with background of the study, statement of the problem, research question, research objectives, significance of the study, scope of the study, organization of the study and definition of key terms. The second chapter will concern on relevant literature related to the topics and sub topics, this involves theoretical literature, empirical literature and furthermore conceptual framework of the study will be present. The third chapter focuses on research design and methodology. The fourth chapter will be concerned on analysis and presentation. The last chapter leads the research paper to the end with summary, conclusion, recommendation and further implications.

CHAPTER TWO

2 REVIEW OF RELATED LITERATURE

2.8 Introduction

Ethiopia has experienced strong economic growth over the past decade, with GDP expanding at an average rate of 10% per year from 2004-2014 (World Bank, 2016). This growth has been led by expansion in key sectors such as agriculture, manufacturing and construction, supported by government investments in infrastructure and industry development. Ethiopian International Airlines (EIA), the national flag carrier, has played an important role in facilitating Ethiopia's increasing trade and economic ties with international markets.

EIA launched dedicated freighter services in 2008 with the aim of boosting Ethiopia's agricultural and manufacturing exports (EIA, 2020). Since then, the airline's cargo division has steadily expanded its infrastructure, fleet and global route network. In 2019, EIA handled over 180,000 tons of cargo, generating around 18% of the airline's total revenues (EIA, 2020). Key export commodities transported via air include coffee, flowers, pulses, spices and leather products. EIA now serves over 90 international destinations from its hub in Addis Ababa through a mix of freighter aircraft and bellyhold capacity on passenger flights.

However, despite strong economic and cargo traffic growth over the past decade, Ethiopia's share of cargo exported via air compared to other modes such as sea and road transportation remains relatively low (Ethiopian Revenue & Customs Authority, 2019). The on-time performance and reliability of EIA's freighter operations have also faced frequent criticism from cargo shippers citing delays, capacity constraints and inconsistent schedules (Klophaus, 2019). While the national carrier attributes some shortfalls to factors outside its control such as weather disruptions, industry analysts argue that systematic issues relating to infrastructure, regulations and network planning also contribute to challenges facing Ethiopia's air cargo competitiveness (Tessema, 2024).

As the Ethiopian economy continues to diversify and globalize, the efficient movement of high-value and time-sensitive export cargoes will grow in strategic importance.

Maintaining and expanding foreign market access for agricultural and manufactured goods relies on reliable supply chain connectivity. Air cargo is uniquely positioned to facilitate fast and long-distance transportation of produce and other goods still fresh upon arrival, as well as specialized cargo types requiring temperature control or timely delivery. However, without addressing underlying constraints facing the enabling role of air cargo logistics, Ethiopia risks losing competitive ground to regional peers with more developed cargo infrastructure and services.

Against this background, the specific objectives of this research are:

- 1) To analyse the current performance and growth trends in Ethiopia's air cargo export trade.
- 2) To identify and assess key internal and external factors affecting the competitiveness and on-time reliability of EIA's international cargo operations.
- 3) To develop evidence-based policy recommendations to strengthen Ethiopia's air cargo infrastructure and regulatory environment in support of export sector growth.
- 4) To contribute original empirical research addressing literature gaps on determinants of air cargo trade competitiveness in an African market context.

By examining experience to-date and operational challenges faced by EIA's cargo division handling Ethiopia's exports, this study aims to add valuable insights for strategic infrastructure investment and regulatory reforms supporting the continued expansion of high-value trade sectors reliant on fast air connectivity. The findings also hold practical significance for EIA in refining its fleet and network planning to better satisfy shipper demands. From an academic perspective, this research contributes empirical analysis of air cargo factors in an under-researched emerging market context.

2.9 Theoretical Framework

This section presents the theoretical foundations that underpin the key factors analysed in this research. Porter's theory of competitive advantage and economic determinants of export trade performance provide a lens for understanding the attributes and influences that shape the air cargo logistics environment in Ethiopia.

2.9.1 Porter's theory of competitive advantage

Michael Porter's "The Competitive Advantage of Nations" (1990) introduced a framework that relates a nation's competitive success, as evident in international trade, to four interdependent attributes known as the "Diamond of National Advantage". These attributes include factor conditions, demand conditions, related and supporting industries, and firm strategy, structure and rivalry.

Porter posited that the combination and interaction of these diamond attributes ultimately determines the competitive position of industries within global markets. Of particular relevance to this study are factor conditions, being the basic inputs necessary for international competitiveness. Factor conditions can be subdivided into general and specialized factors. General factors refer to unspecialized inputs such as natural resources, unskilled labour and climate that are readily available to all nations.

More pertinent are specialized factors that are created rather than inherited. Specialized factors driving nation's competitive advantage include infrastructure, skilled labour pools, specialized knowledge and capital specific to certain industries (Porter, 1990). Infrastructure constitutes physical capital such as transport systems, communications facilities and electricity grids that support overall productivity. Modern infrastructure forms the backbone of advanced logistics networks enabling fast, reliable cargo flows between origin and destination markets.

According to Porter, governments play an important role in nurturing specialized factors conducive to competitive advantage. Active government policy represents a "diamond modifier" capable of upgrading factor conditions through targeted investments. Examples include developing port and customs infrastructure to facilitate trade, training technical skills relevant to high-growth industries and deregulating sectors to encourage venture capital flows (Porter, 1998).

The state contributes to competitive success not by directly intervening in markets but rather by stimulating private sector performance through general policies and institutional frameworks conducive to business (Porter, 1990). Governments facilitate competitive advantage by focusing on upgrading factor inputs instead of individual competitors or

industries. This implicates the need for a strategic national air cargo infrastructure vision able to raise Ethiopia's factor conditions as a whole to strengthen export competitiveness over the long-run.

Applying Porter's theory to the Ethiopian context, specialized air cargo infrastructure along with skilled logistics professionals represent important yet underdeveloped factor inputs relative to regional competitors. Active development of these factors through collaborative public-private initiatives could help propel Ethiopia up the value chain into high-growth exports additionally reliant on rapid connectivity to shelf-life-sensitive markets abroad.

2.9.2 Determinants of export trade performance

An extensive body of empirical research has validated several core determinants influencing the growth and composition of trade flows between nations. Principal among these are infrastructure endowments, customs efficiency and the availability of transport connectivity options both within domestic borders and beyond to overseas markets. Each presents a potential area of competitive advantage or disadvantage as outlined below.

Modern infrastructure serves a dual role as a driver and enabler of export activity. Numerous studies demonstrate infrastructure's trade creation effects through improved market access, lower transport costs and enhanced supply chain management capabilities (Limao&Venables, 2001; Limao& Anthony, 2007; Clark et al., 2004). Particularly for landlocked nations, quality regional transport corridors directly translate into higher export shares of GDP (Raballand et al., 2012).

Air cargo infrastructure allows proximity to global buyers despite the tyranny of distance. Strategic airport hubs cultivate efficiency, reliability and network effects helping firms capture higher-margin overseas sales (Button & Yuan, 2013). Beltran (2017) found airport capacity expansion stimulates national export variety by reducing barriers to distant new trade partners. These findings affirm infrastructure as a foundational competitive factor in today's interconnected global economy.

Customs administration represents another critical trade interface where delay and unpredictability undermine price competitiveness abroad (Djankov et al., 2010).

Simplified customs procedures promote trade flows through reduced clearance times, transparency and lower compliance costs, especially for SME exporters of perishables requiring speed to market (Lee & Sousing, 2013;Moise&Sorescu, 2013). Regional regulatory harmonization also enhances logistics connectivity beyond national borders. Limited transport capacity and unreliable schedules pose ongoing challenges in landlocked nations where domestic and cross-border mobility hamper integration into global value chains reliant on just-in-time rhythms (Freund & Rocha, 2011). Strategic allocation of national carrier belly-hold space ensures export competitiveness where pure freighter options are scarce (Daumal&Ochieng, 2018). Intermodal connectivity further boosts trade by managing variability inherent to single modal dependence on road, air or rail alone.

2.9.3 Infrastructure

Critical infrastructure serves as a fundamental determinant of export competitiveness according to the theories outlined previously. This section examines global best practice standards before assessing Ethiopia's infrastructure landscape across airports, ground connectivity, and implications for supply chain capabilities.

2.9.3.1 Global airport infrastructure standards

The International Air Transport Association (IATA) provides widely adopted guidelines for airport infrastructure planning and evaluation. Key IATA criteria include sufficient apron stands to accommodate peak fleet rotations, dedicated temperature-controlled warehousing for pharmaceuticals and perishables, advanced cargo handling systems to expedite sorting/tracking, and a centralized free trade zone for temporary storage and value-add services (IATA, 2018).

Modern cargo facilities optimize multimodal transfer connectivity between airside operations and landside road/rail interfaces. Strategically located off-airport developments decongest terminal capacity while streamlining cargo flows into major population/industrial centres. Critical mass and scale effects arise from major consolidation/deconsolidation hubs serving wide catchment areas (IATA, 2016). Global

standards promote harmonized safety/security compliance to facilitate seamless cargo movement worldwide.

2.9.4 Ethiopian airport infrastructure

Ethiopia's airport infrastructure evolved in tandem with overall economic development. Bole International Airport (ADD) in Addis Ababa historically focused on passenger traffic as the flagship hub for Ethiopian Airlines (ET). Limited dedicated warehousing/equipment hindered growing import-export demand through ADD's mixed-use facilities (Ethiopian Civil Aviation, 2014).

Upgrades in the 2010s aimed developing specialized terminals to support priority sectors. A state-of-the-art pharmaceutical complex fulfilled GDP certification while new refrigerated zones handled horticultural shipments from flower/vegetable cooperatives (Debre Zeit Airport Authority, 2018). Off-airport logistics parks offer value-add services to flowers/leather clusters in Oromia/Tigray regions respectively.

However, shortfalls remain versus competitor hubs in modern automated systems, long-term capacity planning and multimodal linkages integration (UNECA, 2019). Heavy reliance on ET's single ADD hub exposes vulnerability to disruption. Underdeveloped regional airports also hamper effective hinterland coverage. Sub-Saharan Africa lags global benchmarks with only 15% of airports attaining basic IATA standards on average (AfDB, 2017).

2.9.4.1 Domestic transportation infrastructure

Ethiopia faces a dual infrastructure deficit constraining both internal/external connectivity. Limited paved roads outside major population centres increase freight transportation costs estimated 20-40% above neighbours (World Bank, 2015). Rural feeder road upgrades under the Growth & Transformation Plan established collection centres yet final-mile links remain fragmented.

Ethiopia's sole railway linking ADD with neighbouring Djibouti operates at under capacity due to rolling stock shortages and isolated nature from domestic hinterlands (UNECA, 2017). This dependence on dated roads increases export transit times 2-3x

compared to integrated rail/port corridors used by landlocked peers (African Development Bank, 2019).

Air cargo also relies on trucking for domestic legs, risking schedule slippage and cargo integrity issues on unpaved segments vulnerable to weather disruptions (Ethiopian Roads Authority, 2016). Multimodal integration initiatives lag implementation without coordinated strategic planning across sectors like aviation and rail. Promising Dry Port developments in Modjo and Awash remain underutilized.

2.10 Effects on supply chain performance

Deficiencies in Ethiopia's airport and transport infrastructure propagate costs and delays throughout export supply chains relative to regional competitors. The lack of specialized cargo zones increases handling charges which squeeze price competitiveness for perishables in highly elastic overseas flower/fruit markets (UNCTAD, 2019).

Farmers face post-harvest losses from infrastructure gaps affecting the entire horticultural cold chain from collection to cold storage to air transportation according to the Agriculture Transformation Agency (ATA, 2018). Volumes of high-value but temperature-sensitive exports like mangoes, papayas and berries consequently remain low.

Dependence on truck-only transportation extends transit times and increases risk of inventory shrinkage from road conditions, congestion and accidents (ATA, 2016). Higher transportation costs consume 10-15% of the free-on-board value for Ethiopian exports versus the 6-8% average for landlocked developing countries (World Bank, 2020).

Inconsistencies disrupt just-in-time connectivity to global supply chains. These issues suggest Ethiopia has further to go in developing infrastructure that strengthens time/cost competitiveness and resilience within integrated intermodal networks identified as necessary factor inputs by Porter's Diamond theory

2.11 Customs System and Regulations

As a critical border interface, customs procedures significantly impact trade competitiveness. This section analyses Ethiopia's customs landscape in relation to

regional coordination efforts and international best practices, concluding with implications for air cargo competitiveness.

2.11.1 Ethiopian customs clearance procedures

Domestically, the Ethiopian Revenue and Customs Authority (ERCA) administers documentation requirements for imports and exports. Clearance involves submission of a customs declaration, commercial invoice, packing list, certificate of origin, inspection report and license/permits if applicable (ERCA, 2024).

Manifest information is validated against physical cargo examination selected through risk profiling. While automated, the cargo Community System (CCS) still lacks full electronic data interchange between operators and customs (UNCTAD, 2019). Challenges around multiple signatories, ambiguity of rules and lack of advance cargo processing drag out clearance times reported between 1-5 days on average (World Bank, 2024).

Stakeholders perceive inconsistencies in risk criteria and physical inspections as non-transparent, though measures tighten according to security incidents (ECA, 2024). Valuable resources could instead target high-risk cargo using intelligence-led selectivity (ERCA, 2015). Limited express lanes prioritize perishables yet coverage remains limited to major trade corridors (Ethiopian Horticultural Producers and Exporters Association, 2018).

2.11.2 Regional customs integration

Various initiatives aim harmonizing procedures across the Horn. As an EAC and COMESA member, Ethiopia coordinates border agency procedures on transit cargo moving between member states (COMESA, 2024). Under the Trade and Development Bank-funded Trade Information Portal, online pre-clearance submission now serves for road haulers on key bilateral corridors (Tripartite, 2015).

However, full benefits of a single customs territory still elude the region (ERCA, 2024). Non-physical barriers arise from lack of mutual recognition on standards and testing

procedures between laboratories regionally (AfriExim, 2024). Technical rules on SPS standards between the EAC also need alignment for seamless trade in agricultural goods regionally highly reliant on transportation infrastructure (EAC, 2019).

2.11.3 International regulatory frameworks

IATA's guidelines promote cargo security and facilitation standards covering screening equipment, database integration between supply chain parties and risk-based pre-clearance to preclude delays downstream at destination airports (IATA, 2020). As a WCO member, Ethiopia also implements World Trade Organization provisions under the Trade Facilitation Agreement (TFA) to simplify and harmonize cross-border procedures internationally.

ERCA coordinates cargo security compliance with the International Civil Aviation Organization's security program while working to fulfil national single-window infrastructure recommended under TFA to streamline clearance processes (ICAO, 2019). However, limited coordination of regulatory regimes across multiple international agreements hinders consistent cross-sector standards application in practice (UNECA, 2017).

2.11.4 Impacts on air cargo competitiveness

Cumbersome customs add significant costs that strain exports especially for SME producers. Clearance delays exceeding targets under bilateral and regional trade agreements disrupt just-in-time supply chains upon which perishables are increasingly reliant (ERCA, 2018). Transit times double where physical inspection levels remain high according to major freight forwarders (Agility, 2020).

Unpredictable treatment at borders introduces risks that discourage export diversification towards new markets via regional roads and ports (Afreximbank, 2016). Ethiopia therefore loses potential shares of high-value trade dependent on integrated East African logistics corridors according to the theoretical frameworks of competitive advantage discussed. Streamlining customs thus presents an opportunity to reinforce time/cost competitiveness.

2.12 Ground Handling Operations

2.12.1 Global best practices in cargo handling

Efficient ground operations lower costs and enhance reliability core to supply chain integration. IATA recommends metrics like throughput volumes per worker-hour, first-time loading accuracy and average turnaround times below 90 minutes to maximize daily fleet productivity (IATA, 2024).

Modern tracking utilizes electronic tags, mobile scanning and warehouse management systems. Consolidation hubs automate sorting, transferring cargo between flights using conveyor belts and segregation by destination/commodity type (ACI, 2019). Temperature-controlled areas monitor conditions end-to-end as per Parma guidelines.

Strategic facility locations near free trade zones streamline customs while accommodating express and consolidator operations. Outsourcing non-core activities from aircraft loading to heavy equipment operation helps airlines focus on network management (Air Cargo News, 2018). Regional airports specialize in domestic collection/distribution to aggregate demand.

Ethiopian airports ground handling

At ADD, Ethiopian Cargo Service (ECS) oversees facilities now handling 181,000 annual tons (ECS, 2020). However, limited dedicated wide-body equipment, underinvestment in technology and workforce shortages strain productivity during peaks. Congestion arises from a mix of passenger and freighter operations within common-use sheds.

Outside ADD, basic reflexive handling endures with manual paperwork, single-bay loading and a lack of temperature control posing risks for perishables (International Logistics Mozambique, 2019). Regional airports' essential role aggregating hinterland trade relies on investment to attract additional carriers and develop complementarity with domestic road/rail links.

2.12.2 Effects of route networks and delays

Unique challenges arise serving a dual-hub domestic and international operation from landlocked Ethiopia. Pressure mounts to accurately allocate limited belly hold space across multiple flights to synchronize cargo with passenger schedules according to IATA slot coordination (IATA SSIM, 2020).

Missed connections disrupt time-definite cargo, reducing on-time delivery percentages that undermine competitiveness in overseas flower auctions where Ethiopia lags peers (UNCTAD, 2018). Adhering to international Safety Management Systems requires reliable ground links integrated across fleets to consolidate global operations.

Strategic network design could better optimize domestic/regional legs through dedicated regional aircraft and improved surface access to secondary cities' export clusters (IATA Economics, 2019). Capacity improvements proposed at Dire Dawa also aim supporting Ethiopia's ambitious industrialization drive.

2.13 Ethiopian Air Cargo Demand

As outlined in previous theoretical sections, a nation's completeness depends significantly on the strategic development and connectivity of priority export industries. This section analyses Ethiopia's key air cargo export sectors and the role fast connectivity plays in supporting economic growth and global market access.

2.13.1 Key export sectors and commodities

Ethiopia's agriculture-driven trade focuses on coffee, flowers, oilseeds and horticulture.

Coffee: As Africa's largest coffee producer and 6th globally, coffee represents over 25% of Ethiopia's export earnings (ICO, 2024). While prices fluctuated historically amid supply gluts, demand strengthens from expanding specialty roasters attracted by unique origins like Yirgacheffe and Sidamo (Stewart et al., 2018). Air transportation maintains freshness and supports competitive marketing of specialty coffees commanding high international premiums.

Flowers: Contributing over \$350 million annually, Ethiopia emerged as a major cut flowers exporter behind strong cooperatives and suitable highland soils ideal for cool climate varieties (EHPEA, 2020). Roses predominate for the lucrative European Valentine's and Mother's Day seasons requiring reliable cold chain connectivity for Ethiopia to compete against Kenyan and South American producers (IATA, 2019).

Leather: Representing 18% of manufactured exports, leather and leather goods form a strategic value-added sector harnessing Ethiopia's livestock wealth into premium international brands (Ethiopia Leather Industry Development Institute, 2019). Fast freight connectivity supports high-end products meeting demanding just-in-time schedules.

Horticulture: With sizable investment in cold infrastructure and harmonization with phyto standards, exports of tropical fruits and vegetables doubled over the past decade to over \$350 million (MOA, 2020). Air freighting high-value specialty items like avocados and baby carrots targets niche importers willing to pay a premium for off-season supply (ATA, 2018).

Oilseeds: Sesame, Niger seed and linseed account for nearly 10% of total exports and play socioeconomic roles supporting smallholder incomes across diverse agro ecological zones (ATA, 2016). Despite volatility in prices and low yields historically, liberalized markets and contract farming encourage input investment partly reliant on stable connectivity to Middle Eastern crushing facilities.

Figure 2.1: Some of the commodities





2.13.2 Seasonal and international market factors

Ethiopia's export mix leverages its climatic diversity yet production remains tied to bimodal rainfall patterns, concentrating volumes into discrete windows overseas. Schedules optimize these seasonal bulges:

Coffee: Harvest peaks from October-January coincide with demand surges in Europe and North America as winter sets in. Offshore Mediterranean winds favor delicate specialty beans' attributes during transport (Tadele et al., 2016).

Flowers: Production centers in Oromia and Amhara peak from November-May for Valentine's, Mother's Day and summer holidays requiring fast connections to Amsterdam's auctions determining high prices (UN Comtrade, 2017).

Off-season production through irrigation also targets Christmas markets north yet faces higher freighting costs during seasonal peaks abroad constraining volumes (EHPEA, 2024).

Horticulture: Short windows allow premium prices for out-of-season berries, citrus and baby vegetables to Europe, UAE and Saudi throughout the year leveraging storage infrastructure (MOA, 2019).

2.13.2 Role of air cargo in Ethiopian economy

Dependence on natural resource exports leaves Ethiopia exposed to shocks, elevating focus on air-reliant industries able to better leverage competitive advantages. Air cargo underpins 15% of GDP through associated jobs and foreign exchange facilitating broader investment (World Bank, 2024):

- ⇒ Trade enabler for cut flowers generating \$1 billion annually and over 350,000 farm jobs in remote areas.
- ⇒ Tourism driver transporting handicrafts and artifacts to cultural institutions globally promoting visitor arrivals tripling over the past decade.

- ⇒ Industrialization catalyst provisioning imported inputs for rising manufacturers and re-exports via Middle Eastern partners accounting for 25% of Ethiopian exports.
- ⇒ Revenue source vital to sustaining economic growth targets of 10-12% outpacing peers through competitive access to diverse, high-value markets.

Modernizing infrastructure through integrated multimodal networks positions Ethiopia for knowledge-intensive investments aligning with Vision 2025 objectives to cement regional leadership in trade and innovation. Air cargo forms a critical strategic asset if fully optimized.

2.14 Ethiopian Air Cargo Capacity

Capacity provisioning forms the output-side foundation enabling a strong export sector. This section analyzes Ethiopia's air freight capacity landscape and implications for competitiveness.

2.14.1 Freighter fleet profile

Ethiopian Airlines Cargo (ETC) operates a dedicated freighter fleet of two Boeing 777Fs and two Boeing 737-800BCFs supported by belly hold capacity on ET's expanding passenger network (ETC, 2024).

Strategic fleet planning deploys 777Fs on high-volume Asia-Europe lanes essential for cut flowers and horticultural exports. The larger aircraft optimize block times to key Middle Eastern, European and American cargo hubs (IATA, 2019). Smaller 737 freighters service niche regional and domestic legs, facilitating collection from remote zones unable to aggregate full truckloads (ETC, 2018). Such flexibility responds to dispersed smallholder producers yet risks under-utilization versus dedicated trucks.

Narrow body operational constraints include inability to economically reach high-demand long haul Asia destinations, inhibiting year-round market access for temperature-controlled exports as seasonal shifts overseas (IATA Economics, 2020).

Additional widebodies ordered aim meeting projected freighter traffic growth above global averages (Boeing Market Outlook, 2022). However, uncertainties accompany economic downturns exposing ET's dependence on cargo as an alternative revenue stream versus well-hedged Gulf competitors.

2.14.2 Belly hold capacity utilization

Over 50% of Ethiopia's air cargo exports rely on belly hold capacity subject to irregular availability (ETC, 2020; IATA, 2018). Coordination challenges emerge transporting goods across ET's 100+ destination network within passenger baggage compartments.

Perishables face risks alongside luggage during extended domestic legs to hub ADD due to insufficient regional freighter coverage (ATA, 2017). Seasonal peaks similarly strain tightly scheduled belly hold space despite preferential boarding for time-sensitive agro-exports (ETC Freighter magazine, 2019).

2.14.3 Capacity allocation and sales systems

ET's cargo sales systems utilize multiple booking classes according priority over specific routes and aircraft types to optimize revenue versus yields forgone from rejected shipments (IATA Cargo Strategies, 2024).

Volatile demand fluctuations pose challenges, necessitating last-minute bookings that disrupt schedule integrity if unhedged (IATA Cargo Agency Programme, 2024). Over-reliance on a few commodities also concentrates risks from external shocks like weather or disease outbreaks impacting production windows.

2.14.4 Effects of capacity constraints

Capacity gaps impose excess costs on Ethiopia's export competitiveness through unrealized sales, missed connections and diverted trucking movements. Higher risk premier ultimately curb foreign investment in vulnerable sectors like horticulture that could lift millions from poverty.

Limited long-haul freighter options further deter farmer cooperatives from exploring production diversification strategies to stabilize incomes throughout lean seasons abroad.

Narrow networks constrain reach into emerging high-growth but less traditional markets that broaden Ethiopia's participation in complex global value chains (World Bank, 2018).

2.15 Uncertainties in Air Transport

Reliable schedules form a competitive necessity underpinning just-in-time global supply chains critical to high-value perishables. Yet demand variability inherent to cargo transportation poses recurrent challenges. This section analyses major uncertainties faced and strategies applied.

2.15.1 Capacity booking volatility

Last-minute no-shows disrupt carefully optimized aircraft loads causing costly deadheading, earning carriers' ire (IATA Economics, 2022). Complex root causes include overbooking to compensate for typical 10-15% no-show rates or transporters' difficulties guaranteeing committed volumes from remote cooperatives.

Overbooking conversely risks rejected shipments contributing 5-7% of planned cargo according to trade associations (ETC, 2024; EHPEA, 2022). Perishables spoiled in journey delays severely impact small-scale producers lacking stockpiled inventories as insurance.

Cost recovery grows via flexible cancellation policies, minimum volume commitments from major shippers and utilization targets requiring steady consolidation centre throughputs (IATA Cargo Strategies, 2024). Monitoring shipment status enables quick substitution with compliant backup cargo.

2.15.2 Complexities in cargo type management

Specificity demands managing various commodity types alongside mainstream general cargo. Livestock transportation necessitates quarantine pens, vaccinations traceable via RFID to certify animal health under strict import protocols (IATA Live Animals Regulations, 2024).

Compliance with hazardous goods regulations including segregation, packaging, labelling and trained handling multiplies with new industrial/manufactured exports (ICAO Technical Instructions, 2019). EIAC also transports high-value items like artefacts securely against theft (TIACA Secure Transport of High-Value Cargo Guidelines, 2024).

2.15.3 Flexibility and risk mitigation strategies

To absorb volatility, Ethiopian Cargo leverages global interline partnerships enabling flexible rescheduling at short notice onto alternate carriers' capacity when disruptions arise (IATA Cargo Agency Programme, 2024).

Comprehensive cargo insurance further transfer's risks associated with delays, loss or damage to third parties with specialized underwriting expertise and larger risk pools (ACI Cargo Insurance Regulations, 2019). Premium costs moderate as claims frequency drops through centralized tracking technology preventing cargo diversion (TIACA e-AWB Guide, 2024).

Cargo banks also facilitate pre-financing export receivables while producers await payment settlement, reducing systemic risk compared standalone SME operators (Cargex Cargo Finance Solutions, 2020).

Overall, dynamic coordination across a synchronised air cargo community supports Ethiopia's evolving mix of high-value yet unpredictable volumes challenging conventional transportation. Flexible mitigation measures position fast connectivity as a resilience buffer promoting trade growth.

2.16 Export Performance Measurement

Strategic insights require monitoring progress against quantitative targets. This section explores suitable metrics and considerations for analysing Ethiopia's air cargo export competitiveness over time.

2.16.1 Common metrics for evaluation

Revenue/growth: Total export revenue across priority sectors gauges performance against annual GDP growth goals. Segmented annual growth rates by destination reveal partners driving expansion (World Bank DOTS, 2022).

Market share: Ethiopia's share of regional/global markets for core agricultural/manufactured items benchmarks penetration into overseas demand (UN Comrade, 2024). Trends prompt re-evaluating supply response strategies.

ROI: Return on public infrastructure investment evaluates programs through increased air cargo tonnage and cooperative incomes compared investment levels (ATA, 2019; EPA, 2018).

Connection reliability: Adherence to published schedules/block times quantifies connectivity consistency supporting inventory visibility in overseas supply chains (IATA SGO Database, 2024).

Customer satisfaction: Time-sensitive cargo delivery compliance with SLAs surveys shipper perceptions impacting future routing decisions and investment confidence (ETC Customer Survey, 2020).

2.16.2 Delivery reliability and on-time performance

Customers prioritize reliability over price for time-critical deliveries. On-time performance (OTP) measures departures and arrivals within 15 minutes of scheduled block times, a core KPI for freight forwarders tracking performance across multiple carriers (IATA Airports, 2022).

Ethiopia compares against 75-80% regional and 85% global targets to benchmark delays against peers whose infrastructure may better absorb disruption (ACI Cargo IQ, 2024).

Connectivity consistency supports just-in-time responsiveness necessary for perishables worldwide.

2.16.3 Data considerations in the Ethiopian context

Sound performance management requires accurate, comparable data. However, Ethiopia currently lacks centralized record-keeping across government entities and private operators to holistically track air cargo volumes, values and metrics affecting competitiveness over time (UNECA, 2017).

International standards promote aggregation of dispersed records into a common consolidated database aligned to regulatory and industry KPI definitions, classifications

and periodicity (WCO, 2020). Regional harmonization enhances benchmarking Ethiopia against integration partners for early warning of deterioration against peers.

Integration of disparate existing sources from customs, aviation, transport and cooperatives represents a foundational step to evidence-based policymaking and targeted intervention where trade efficiency lags aspirations. Modern digital solutions accelerate indicator computation.

Collectively, establishing such performance yardsticks forms half the solution - implementation depends continued collaborative effort across stakeholders to populate indicators enabling strategic course correction benefiting export-driven growth.

2.10. Research Gaps

While substantial research explores aviation and international trade theory, limited scholarly attention delves into Ethiopia's air cargo landscape. Addressing knowledge voids represents an opportunity to better guide strategic development.

2.16.4 Gaps in literature on Ethiopian air cargo

Infrastructure: There is limited quantitative research that specifically analyses how investments in Ethiopian airport and transport infrastructure impact the competitiveness and growth of air cargo exports. Few studies have attempted to credibly estimate the economic returns to infrastructure through its effects on logistics costs, reliability, production volumes and market access. Qualitative case studies also tend to examine infrastructure developments in isolation without consideration of interacting policy factors. A holistic understanding of infrastructure's role within Ethiopia's overall export supply chains is lacking.

Customs procedures: Evaluations of Ethiopia's customs reforms and their ramifications for trade costs and flows have been sparse. Challenges with implementation and unintended consequences are not well documented. Linkages between customs and complementary policies aimed at trade facilitation also tend to be overlooked. This prevents drawing lessons on successfully sequencing and coordinating multilateral initiatives.

Connectivity: Limited empirical work has modelled how developing Ethiopia's domestic and international multimodal connectivity influences logistics performance and the

viability of different economic clusters. Optimization of networks to reduce transport time variability and congestion costs remains under-researched. Spatial analyses are also scarce on infrastructure footprint's economic spill overs within hinterlands.

Capacity planning: Micro-level impacts of constraints in belly hold space availability on smallholders and sectorial diversification opportunities have not been quantitatively examined. Market studies do not shed light on absorptive capacities for maintaining schedule integrity with fluctuating volumes. Research also overlooks productivity impacts of investment in conditional preventative maintenance programs.

Demand forecasting: Predictive modelling and multivariate econometric techniques have seen limited application to project dynamic shifts in Ethiopia's export mix and derive calibrated projections supporting long-term sector planning. Early warning of risks to priority commodities from climate change or overseas demand trends remains an open question.

Policy evaluation: Quantitative assessments of specific interventions intended to strengthen air cargo competitiveness, such as industrial zone incentives or multilateral trade deals, are notably scarce. There is a lack of implementation reviews to extract lessons on replicability, coordination challenges and unintended outcomes over the long-run.

Opportunities for new empirical contributions

Addressing these knowledge gaps opens several high-impact research pathways with practical policy applications:

Econometric analyses of specific initiatives could estimate air cargo infrastructure's marginal contributions to sector productivity, output, jobs and welfare using appropriate identification strategies with control groups. Spatial equilibrium modelling techniques may optimize networks accounting for internal economy effects across industrial clusters nationally and regionally.

Mixed methods supply chain analyses could profile logistics performance across representative clusters to benchmark against best practices and prioritize interventions.

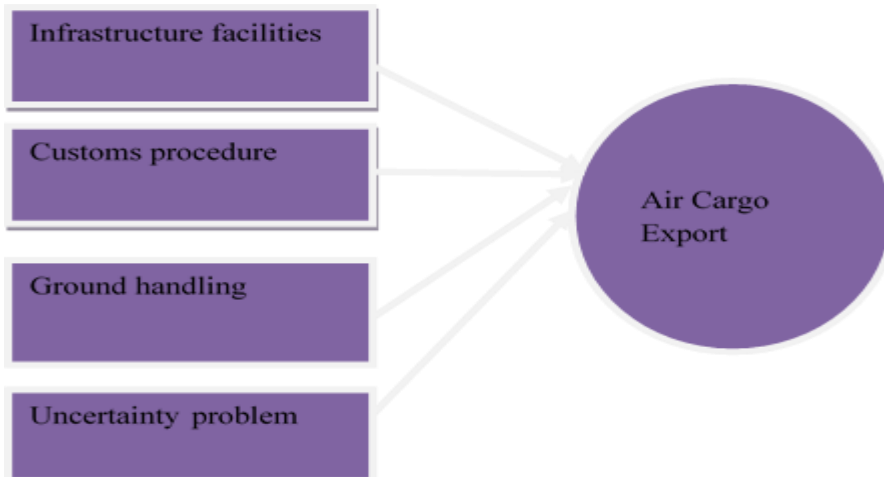
Operations research applications in capacity planning and dynamic demand forecasting would support evidence-based infrastructure investment cycles. Statistical trade modelling and time series approaches could underpin export oriented industrial targeting

tied to competitive advantages. Implementation reviews employing theory-based evaluation designs would distil policy and project design lessons to strengthen results-focus.

By tackling real-world questions through rigorous empirical groundwork, local researchers can play an important role in guiding Ethiopia's export-driven growth strategy underpinned by competitive and resilient air cargo logistics linkages nationally, regionally and globally.

2.11 Conceptual Framework of the Study

Figure 2.1. Model of the Study



Source: Researchers own Development (2024)

CHAPTER THREE

3. RESEARCH DESIGN AND METHODS

Introduction

In order to achieve the objective of the study, clear and appropriate research methodology was essential. The study was focused on Factors affecting Air cargo Export trade; insights based on the perception of employees in Ethiopian International Air cargo Service.

The main purpose of this chapter was to present the underlying principle of research design and methodology, source of data, the selection of appropriate research data collection techniques and method of data analysis in line with research questions proposed before the study.

Research Design

A research design is “a plan or blueprint of how you intend to undertake the research” (Mouton, 1996:165). In this study, the research strategy was survey research strategy, which was appropriate to obtain relevant information from a wide range of respondents. According to the time dimension cross sectional survey was used, which helps to gather data at a particular point in time.

The research methods was both descriptive and explanatory research methods. The descriptive research method was used to describe the existing situations and factors of air cargo export trade. On the other hand, the explanatory research method was used to show the causes and effects relationship between the major factors of air cargo and export trade performance based on the survey strategy.

Research Approach

To accomplish the objectives of this study, a mixed method research approach merging both qualitative and quantitative research methods was applied. The qualitative approach helped to construct the theoretical description of the study while the quantitative approach was essential to describe the numerical aspects. By linking qualitative and quantitative research approach, the advantages of both can be gained. Thus, the researcher uses these two approaches in combination that helps to offset the shortcomings of each approach.

Target Population

The population is the entire group of persons or set of objects and the events the researcher wants to study. According to the Addis Ababa Airport Customs branch office report (2024) currently, there are about 116 exporters and 126 clearing agents in Ethiopian international cargo those who have permanent office inside the terminal. Therefore, the researcher considered 242 estimated numbers of exporters and agents as the target population of the study. (Ethiopian Customs Guide).

Sample and Sampling Technique

Sampling techniques are techniques used to select a sample from the target population. The sampling technique to be used depends on the objective of the study and the nature of the target population. Proper sampling techniques might eliminate bias in the selection process and reduce the costs or efforts in gathering data from the sample population.

For this research, both probability and non-probability sampling techniques was applied . The probability sampling technique was used to select sample respondents and the non-probability sampling was used to select key informants. Regarding to probability sampling, first proportionate simple random sampling technique was applied. This involves selection of 148 respondents from the cargo community. This made the sample to be better representative of the target population.

From the non-probability sampling technique, Purposive sampling were also used to select key informants including ET and custom mangers to get detail and sufficient data on the issue taken an interview based on the researcher's convenience.

According to Taro Yamane's sample size formula (1967)case of finite population

($n = \frac{N}{1 + N(e)^2}$) where N= target population, e= error of the sample(0.05) z=confidence level (95%). total population from three functional units are 242 exporters and clearing agents in Ethiopian international cargo. Therefore, the following formula was applied to determine the sample size.

$$n = \frac{N}{1 + N(e)^2}$$

$$n = 242 / (1 + 242 * 0.0025) = 148$$

Table 3.1: Summary of Samples

Target populations	Total population	Sample size	Sampling Techniques	Data Collection Techniques
EAL and CC Managers and vice managers	8	4	Purposive	Interview
Exporters	116	71	Simple Random	Questionnaire
Clearing Agents	126	77	Simple Random	Questionnaire
Total	242	148		

Source: Researcher’s own Development, 2024

$$116 * 148 / 242 = 71$$

$$126 * 148 / 242 = 77$$

Therefore, 147.69~148 samples were taken from the total target population by Yamane’s

$$n = \frac{N}{1 + N(e)^2}$$

formula

Data Type and Source

3.9.1 Primary Sources of Data

For this research, the primary sources of data were collected from Ethiopian Air cargo managers and customs commission managers through interview and from clearing agents and exporters through questionnaires.

3.9.2 Secondary Sources of Data

Secondary sources of data related to factors of air cargo export was gathered from Ethiopian cargo websites. Regarding to fleet size and number of freighter aircrafts, warehouse, number of operators and air craft annual distance coverage and trip frequency data was also collected from the EAL data related to terminal condition and the weighing station was also gathered from EAL, related to export, custom checkpoints will gather from CCAAA branch office and other published and unpublished materials, websites documents that are relevant to the study will gather from concerned bodies.

Data Collection Methods

The method of data collection for this study involves, document review questionnaires, interview, and field observation:

Method of Data Analysis

This study SPSS software was applied to conduct correlation and multiple linear regression procedures to answer the basic research questions. This Method was used to analyze answers of respondents for each question. Answers were collected by questioner is transfer to the excel sheet in order to classify analyze them. Then a report were confirm on the questionnaire, which allows comparing the results of the respondent's answer to the questionnaires. In this ways the trends of the respondents can be identify and then each answer will analyze in detail. Then all analysis performs by SPSS V-22 (Statics Package for Social Science).Descriptive analysis (mean and standard) was also used to analyse respondent general profile and so on. The qualitative data gathered were narrated in statement form. Finally, the findings were presented using tables, graphs and percentages.

3.12 Ethical Consideration

This research was conducted in a manner that is reliable with the ethical issues which need to be considered. Accordingly, a letter from Addis Ababa University, Department of Business Administration was necessary to give for the concerned bodies. Hence, the researcher informed the respondents about the purpose of the study in the introduction part of the questionnaires and an interview guide to the respondents and confirm that subject of confidentiality was protected. In addition to this, they were informed that their participation in the study was based on their consent. The research will not personalize any of the respondent's response during data presentations, analysis and interpretation. Furthermore, all the materials used for this research will have acknowledged.

3.13 Description of the Study Area

Ethiopian Airlines simply Ethiopian hereafter EAL, is Ethiopia's flag carrier and serves 127 international and 24 domestic destinations for passenger and 57 air cargo international destinations. EAL, today more than ever before, aggressively expanded its presence or destinations in all directions of the globe and flies to more destinations in Africa than any other carrier (WWW.Ethiopianairlines.com).

EAL has been playing a pivotal role in advancing economic development of the country. For 75 years now (1946-2024). EAL made a positive net economic value contribution to the national economy by facilitating trade, investment and tourism in line with its vision. The value added is measured in terms of contribution to GDP, employment, and comes in the form of visitor expenditure as well as jobs created in Hotels and facilities at spend. EAL aimed to be fast, profitable and growing airline by providing excellent air transport services and was the most competitive and leading aviation group in Africa by providing safe, market driven and customer focused passenger and Cargo Transport, Aviation Training, Flight Catering, Maintenance Repair and Overhaul (MRO), Ground Services, Domestic and regional services by 2025. :

EAL won the African Airline of the year award for 2016 during the 25th anniversary African Aviation Air Finance Africa Conference & Exhibition and African Aviation Summit held on May 2016 in, South Africa.

EAL aviation Academy has been recognized as ICAO Regional Training Centre of Excellence on May, 2016 at the ICAO's Global Aviation Training and Train air plus symposium.

Ethiopian Airlines has won Airline of the Year Award for the fifth year in a row, at the 48th Annual General Assembly of the AFRAA held on November 24, 2016.

Despite the above and other successes, the researcher believe that prior success is no guarantee for future , as EAL is part of a highly dynamic industry characterized by low profit margins, high competition internationally, unpredictable events, and emerging challenges which continuously keep changing the competitive environment. Therefore this paper tries to addresses what major factors affect air cargo export trade in Ethiopian international air cargo from the balance sheet and income statement items. In short the study will address the factors of air cargo export trade performance in the case of bole international airport.

3.14 Reliability Test Result

The reliability test was an important instrument to measure the degree of consistency of an attribute which is supposed to be measured. As stated by Mahon and Yarcheski (2002), the less variation of the instruments produces in repeated measurements of an attribute the higher its reliability. Reliability can be equated with the stability, consistency, or dependability of a measuring tool. Cronbach's alpha is one of the most commonly accepted measures of reliability. It measures the internal consistency of the items in a scale. It indicates that the extent to which the items in a questionnaire are related to each other. It also indicates that whether a scale is one-dimensional or multidimensional. The normal range of Cronbach's coefficient alpha value ranges between 0-1 and the higher values reflects a higher degree of internal consistency. Different authors accept different values of this test in order to achieve internal reliability, but the most commonly accepted value is 0.70 as it should be equal to or higher than to reach internal reliability (Hair et al., 2003).

Table 3.3 Cronbach's Alpha for each variable

Variable	Cronbach's Alpha	No of Items
Infrastructure facilities	.815	6
Customs clearance procedure	.754	5
Ground handling process	.785	5
Uncertainties	.836	5
Export Performance	.868	5
Total	.911	5

Source: SPSS output 2024

The Cronbach's coefficient alpha was calculated for the entire questionnaire. Table 3.3 above, depicts that the values of Cronbach's Alpha for the entire questionnaire is 0.911 that indicates a very good reliability so the results of this paper are reliable. The following variables are acceptable because Cronbach's Alpha for each variable between 0.868 up to 0.754.

CHAPTER FOUR

4. Data Analysis and Discussion

4.1 Introduction

In this chapter, the data collected from primary and secondary source through questionnaire, interview, field observation and document review were analysed in line with the objective of the study. The data collected were organized in a systematic manner to enable the analysis more understandable. This section comprises demographic characteristics of the respondents, the findings of the study and the discussion part.

The data were analysed in different sections: reliability, descriptive analysis, correlation analysis, and multiple linear regression analysis.

Reliability: in a study focuses on whether the research method and design is accurate (Cooper & Schindler, 2008).

Descriptive statistics: to examine the variables being used based on their performance.

Correlation analysis: using Person's test was used to examine the association between air cargo transport and export trade.

Multiple Linear regression analysis: was used in an attempt to demonstrate the impact of the four major factors in explaining the overall export trade performance.

4.2 Response Rate on the Questionnaires

For this study, a total of 148 questionnaires were distributed to the employees of customs and EAL, exporters and clearing agents currently working in Ethiopian international cargo to assess the factors affecting air cargo export trade performance. Out of 148 questionnaires distributed 147 questionnaires were filled up and returned with response rate of 99.3%.

Table 4.1: Response Rate

Questionnaires	Frequency	Percent
Correctly filled	147	99.3%
Not returned	1	0.7%

Source: SPSS output from survey data, 2024

4.3 Demographic Characteristics of the Respondents

This part commences with the analysis of the demographic data gathered from the respondents using frequencies and percentages. Accordingly, the general respondents' characteristics including: sex, age and educational level are presented in Table 4.3 below

Table 4.3: Demographic Characteristics of the Respondents

Respondents characteristics	Categories	Frequency	Percent
Gender	Male	99	67.3
	Female	48	32.7
	Total	147	100.0
Age	20-30 yrs	25	17.0
	31-40 yrs	63	42.9
	41-50 yrs	54	36.7
	Above 50 yrs	5	3.4
	Total	147	100.0
Educational Level	Diploma	50	34.0
	First degree	73	49.7
	Masters and above	24	16.3
		147	100.0

Source: SPSS output from survey data, 2024

As indicated in Table 4.3, out of 147 sampled respondents, 67.3% were males and 32.7% were females. This indicated that the sex composition in the organization was dominated

by male. Regarding to age category, 25(17.0%) of the respondents were within the age category of 20-30 years, 63(42.9%) were within 31-40 years, 54(36.7%) were within 41-50 years and the remaining 5(3.4%) were 50 years old. This revealed that the majority of the respondents were between 31-50 years old who were within at most productive age category.

In terms of educational status, 34.0% of the respondents were qualified with diplomas and below, 49.7% were degree and the rest 16.3% were masters and above. This indicated most of the respondents were degree holder that could better understand the questions and gave reliable information.

4.4 Descriptive Statistics of the Variables

Air cargo transportation drives economic and social growth and supports and accelerates global trade, with an estimated 35% of value of global trade carried by air, though it accounts for less than 1% by volume. The role of air cargo is enormous in time-sensitive products such as agri perishables, horticulture and floriculture, marine products, pharmaceuticals, electronics, fashion garments. However, many factors affect air cargo export such as infrastructure facilities, customs procedure, ground operations and uncertainties.

The feedback of the respondents for the variables indicated below were measured on five point Likert scale with measurement value 1= Strongly disagree; i.e. very much dissatisfied with the case described; 2= Disagree, i.e. not satisfied with the case described; 3= Neutral, i.e., uncertain with the case described; 4= Agree, i.e., feeling all right with the case described and considered as satisfy; and 5 =strongly agree, i.e. very much supporting the case described and considered as highly satisfy. To make easy interpretation, the following ranges of values were reassigned to each scale: 1-1.8= strongly disagree; 1.81-2.6 = Disagree; 2.61-3.4= Neutral; 3.4-4.20= Agree; and 4.24-5 = Strongly Agree Best, (cited in Simachew, 2014). To analyze the collected data in line with the overall objective of the research undertaking, statistical procedures were carried out using SPSS version 20 software.

4.4.1 Descriptive Statistics of infrastructure facilities

Airports were developed primarily from passenger stand point of view, and thus requirement of cargo facility development was not taken seriously. Cargo is generally the last part to be thought of and is relegated to that part of the airport, considered not important otherwise. This leaves the entire logistics of cargo – infrastructure and facility in woefully inadequate and poorly managed area of the airport.

Cargo infrastructure at any airport is just not the cargo terminal building that houses the warehouse but also the related facilities including special facilities for express freight, frozen foods, airmail, and hazardous goods. Infrastructure also includes specialized equipment, connecting roads, truck parking terminal, public amenities like offices for intermediaries, public car parking area etc.

Ethiopian international Cargo Terminal facilities include Perishable cold room 4200 m² (For export flower & vegetables storage purpose), Cold room 2835 m² (for export meat & other temperature sensitive shipments storage purpose), Deep freezer facility 112.26 m² (for shipments to be stored up to -20oc temperature range), Office building (for different stakeholder users) 1600 m² (having 2floor level building), Parking area for different stakeholders & customers 9000 m², Oversize shipment handling warehouse 3300 m² and Warehouse for handling different types of cargo shipments 17,000 m² (with proper material euro pallet handling racks & standard ULD handling storage racks).

Table 4.4.1 Comparison of air cargo infrastructure operations in Ethiopia with global best practices

Global Best Practices	Cargo Operations in Ethiopia
Segregated facilities for different types of cargo	The terminal didn't offer separate facilities, except cold rooms
Dedicated and specialized perishable handling facilities that cater to end-to-end supply chain needs	adequate cold chain infrastructure (temp-controlled warehouses, trucks) to handle agricultural, pharma and other perishable commodities
Proper waiting area for trucks	cargo terminal has enough landside and airside parking / holding area
Agent warehouses, office spaces and other processing facilities close to cargo terminal	Agent warehouse are often located within the city except their office
Promotes transshipment handling/hub operations	Cargo terminal operators need to have separate handling area for transshipment handling
Extensive use of CCTV	CCTV coverage often limited to specific areas of air cargo complex
Unrestricted working hours	Ethiopian cargo have 24 hour working hours
Efficient utilization of terminal space through multi-level storage	Only ETV Systems installed
Increase in productivity, through unmanned vehicle and better accuracy in handling	Mostly Labour intensive operations in Ethiopian cargo
Only physical loading outsourced	Most aspects of Cargo operations didn't outsourced to 3rd parties

Source: Ethiopian airlines cargo section, 2024

With regard to the respondent's reaction with the factors of air cargo export, the following statements were given to indicate their degree of agreement

Table 4.4:2 Statistical Review of infrastructure facilities

Items	Number	Mean	Standard deviation
The Ethiopian air cargo has enough normal size shipment handling warehouse	147	4.571	.4966
The Ethiopian air cargo has enough Oversize shipment handling warehouse	147	4.571	.4966
The Ethiopian air cargo has enough Parking facility for both landside and airside	147	4.571	.4966
Cargo terminal has enough airside space for its aircrafts	147	4.571	.4966
cargo terminal has enough cold chain facility for temperature sensitive's	147	4.701	.4595
cargo terminal has automated Technological infrastructure facilities	147	3.980	.9614

Source: SPSS output from survey data, 2024

As it can be seen from the Table 4.4 above, the scored mean value of the first sub-construct i.e. there is enough normal size shipment handling warehouse in Ethiopian air cargo was 4.571, indicating that the respondents agreed in their response showing that they feel all right with the case described. The standard deviation of this sub-construct was 0.4966; this implies that the relative homogeneity of the respondents on their responses. From this result one can infer that the Ethiopian international air cargo have enough warehouse facilities that may help to upgrade export trade performance and achieve the company objectives in the desired way.

The maximum mean score is 4.701 found on the 5th construct (i.e. cargo terminal has enough cold chain facility for temperature sensitive's) and the minimum mean score is obtained from the 4th construct (i.e. automated Technological infrastructure facilities.) which has an average mean value of 3.980.

In general, the above table reveals that the scored mean value of the respondents to all sub-constructs lies between the range 3.980 and 4.701 signifying an agreement range. This shows that the respondents were on average agreed with the infrastructure facilities are available in Ethiopian international air cargo which also determines export trade performance.

4.4.2 Descriptive Statistics of Customs procedure

The general customs procedures applied by ERCA are categorized into eight distinct sections such as Permanent Export, Temporary Export, re-export, Entry for Home Use, Temporary Import, Re –Importation, Entry for Customs Warehousing and Customs Transit. In line with those general procedures, there are different Customs Procedure Codes which are revised and implemented in ASYCUDA++ (Customs proclamation no. 859, 2014).

The general customs clearance procedures in Ethiopia,

- i. Lodgement of entry: the exporter/agents are required to complete the customs declarations,
- ii. Checking of declaration, the face vet officer receive and check the goods of declaration against the document produced whether it is as per the instruction or not, then accept or reject,

Identifying risk level: the risk level of the documents identified using the ASYCUDA++ system to make risk based treatment or control (Customs proclamation no. 859, 2014).

An examination of goods: this activity is undertaken by the examiner to assure that the goods and conditions of the declaration are the same with the nature, origin, quantity and value of the goods (Customs proclamation no. 859, 2014).

Release of goods: this is the action taken by the customs to permit goods undergoing clearance to be placed at the disposal of the persons concerned, after the fulfilments of all the formalities (ERCA, 2010).

Most of the reason can be attributed to the fact that 100% cargo is customs processed through airport terminal and not taken to consignee or forwarder's location under bond for later time clearance. Delay occurs on account of delay in submission of documents necessary for clearance, issue of mis-classification of goods etc. Further the dwell time also increases because of working habits of everyone involved in the process. The actual working of clearance starts only after 12:00 hours. In case of exports, most of the dwell time can be attributed to airlines booking and accepting cargo much ahead of flight departure.

Table 4.4.3: Statistical Review of Customs procedure

Items	Number	Mean	Standard deviation
Product/tariff classification issues at customs area affect air cargo export	147	4.31	.866
physical inspection of goods at customs area affect air cargo export	147	3.98	.961
Missing/error in documents affects air cargo export	147	4.13	.846
valuation of customs procedures affects air cargo export	147	3.71	1.129
physical examination of goods at customs area affect air cargo export	147	4.18	.747

Source: SPSS output from survey data, 2024

As shown in the above table 4.4.3, almost all of respondents were agreed with the sub construct i.e. Product/tariff classification issues at customs area affects air cargo export with scored mean value of 4.31, although the highest score from others. The scored mean

value points out that the agreement of the respondents with the case described and the standard deviation was 0.866. The second sub-construct i.e. physical inspection of goods at customs area affect air cargo export, the respondents response scored mean value was 3.98. With regard to the third sub-construct i.e. Missing/error in documents affects air cargo export; the scored mean value response of the respondents was 4.13 with a standard deviation 0.846. Lastly, the second time taking procedure is physical examination of goods at customs area affect air cargo export, the respondents were responded having a scored mean value of 4.18 which is the maximum scored mean value from other sub constructs except Product/tariff classification. This shows that the respondents were “strongly agreed” about the physical examination of goods at customs area. This signifies that the Ethiopian international air cargo communities have a negative attitude towards physical examination of goods at customs area and bureaucracies and making them unhappy. This needs special attention to improve air cargo export and increase its performance.

4.4.3 Descriptive Statistics of Ground Handling Process

Air freight handling in combination with the required documents causes a significant bottleneck in air freight transport and reduces productivity. The average consignment transportation time of six days in the traditional air freight transport chain has remained practically unchanged in 20 years (Turner, et al. 2010). Air freight goods spend around 80% of their time between sender and recipient on the ground (Vahrenkamp, 2007).

The quality of the air freight transport chain is, however, decided on the ground, i.e. in air freight clearance and in the information and communication networking of procedures (Amaruchkul, 2011). Ground handling is the preparation of an aircraft for the next flight (IATA, 2013). If the handling of a pure cargo plane is considered, some handling processes of a passenger plane are eliminated or replaced by others, which are the focus of attention, as the safe and efficient loading of freight. These process includes, Ground power supply / refuelling, Unloading or loading the cargo, Aircraft tow or pushback, De-icing (if necessary).

The ground time of a cargo plane is often higher than that of passenger aircraft. This is due, on the one hand, to a different operating model and, on the other hand, to the fact

that the loading process occupies a large part of the total ground handling, which is particularly due to the various activities and the cargo to be loaded. In order to facilitate loading, facilities for sorting the cargo, distributing it to a suitable Unit Load Device (ULD), transporting it via the apron and loading it into the aircraft must normally be available at the aerodrome.

Table 4.4.3: Statistical Review of Ground Handling Process

Items	Number	Mean	Standard deviation
Unloading or loading facilities time affects air cargo export	147	4.15	.814
Ground power supply / refuelling time affects air cargo export	147	3.61	1.168
Air traffic control restriction affects air cargo export	147	3.56	.966
Technical maintenance of the aircraft affects air cargo export	147	3.49	.996
Flight document preparations affects air cargo export	147	3.64	1.240

Source: SPSS output from survey data, 2024

From the Table 4.6 above, it is possible to draw the following facts. As it is clearly illustrated in the table, the scored mean value of the sub-constructs i.e ground power supply / refueling, Unloading or loading facilities, Air traffic control restriction, and Technical maintenance of the aircraft and Flight document preparations fall between ranges of 3.56-4.15. This shows that the majority of the respondents agreed with the statements given to them. However, the idea of the statements are not positive in which the respondents feel all the sub constructs are the major factors of air cargo export that leads to flight cancelation and offload of goods. Consequently these problems result loss of foreign currency for the government of Ethiopia. Particularly Unloading or loading facilities are the main cause of delay of freighter aircrafts with the mean score value of

4.35 followed by Flight document preparations. The implication is that the company needs additional manpower, Fork Lifts Belt Loaders and Manually operated pallet Jacks.

Among all questions, Unloading or loading is the major cause of delay and time taking in ground handling process with the highest mean score of 4.15 and standard deviation of 0.814 and the lowest mean score (3.56) recorded Air traffic control restriction affects air cargo export.

4.4.4 Descriptive Statistics of uncertainties

Air cargo transport has higher uncertainty than passenger transport in terms of capacity availability. In passenger transport, passengers may cancel reservations, and a small number of passengers may not show up. However, in capacity booking for air cargo, freight forwarders have to pledge the use of the cargo capacity on specific flights ahead of twelve (or six) months (Amaruchkul et al., 2011). The quantity of goods to be shipped is actual rather than booked orders, so this creates high fluctuations in capacity management.

Cargo capacity forecasting is significantly more complex than passenger aircraft capacity forecasting. While the capacity of a passenger aircraft is fixed by its number of seats, cargo capacity depends on the container types used, called unit load devices (ULDs), which are further specified by multiple dimensions, such as pivot weight, pivot volume, type, and centre of gravity (Leung et al., 2009). Multiple dimensions are a key feature of freight, which render both complexity and uncertainty to air cargo capacity management. Therefore, capacity availability, adverse weather condition, security problems both in origin and destination are some of a cause of uncertainties that leads to flight cancelation and offload of export goods.

Table 4.4.4: Statistical Review of uncertainties

Items	Number	Mean	Standard deviation
Capacity availability Affects air cargo export	147	3.71	1.129
The oversized shipment affect air cargo export	147	4.15	.814
Security problems both in origin and destination affect air cargo export.	147	3.51	1.230
Adverse weather conditions affect air cargo export.	147	3.51	.989
Importers order cancelation affect air cargo export.	147	3.52	.982

Source: SPSS output from survey data, 2024

As it is clearly shown in the above table 4.7, the entire sub constructs that it “in need of the company and stakeholders effort for efficient and effective air cargo transport”, the scored mean value of all sub constructs lie in the range of 3.51.-4.15 or all sub construct are approached to agreed on the cases. This signifies that Ethiopia international air cargo export trade is highly affected by Capacity availability (3.71), which means respondents are strongly agreed with the concept. However, the export trade is relatively less affected by Security problems both in origin and destination with mean score of 3.51 and adverse weather conditions affect air cargo export (3.51).compared to other sub constructs.

4.4.5 Descriptive Statistics of Export Performance

The performance of the country’s exports highly dependent on its exchange rate regime and more specifically the real exchange rate .various studies have shown that the demand for the county’s exports increase when its export prices fall in relations to the world prices. The depreciations of its currency compared to other currencies particularly, the dollars makes its exports cheaper on the international market (Sharma, 2011).

Table 4.4.4: Statistical Review of Export Performance

Items	Number	Mean	Standard deviation
Infrastructural Facilities affects export performance	147	3.97	.958
Customs procedure affects export performance	147	4.12	.843
Ground handling affects export performance	147	3.71	1.129
Uncertainty affects air cargo export performance	147	4.15	.814
Stakeholder facilities affect cargo export performance	147	3.61	1.168

Source: SPSS output from survey data, 2024

As indicated in the above table 4.4.4, the major determinants of export performance can be uncertainty and customs procedure with the highest mean score of 4.15 and 4.12 respectively. This refers that uncertainties and customs procedures are the major cause of delay of freighter aircrafts in exporting goods. Not only are these but also infrastructural Facilities and ground handling process another cause of delay of export goods with mean score of 3.97 and 3.71 respectively. The least mean score is recorded with Stakeholder facilities with mean score of 3.61.

4.5 Correlation analysis

The correlation between dependent and independent variables along with the causal effect was analysed using Statistical Package for Social Science (SPSS). The below correlation matrix shows correlation between variables in the questionnaire with a Pearson Correlation coefficient to show the strength of relationship among the variables considered in the questionnaire. As per table Below, the coefficient show that all independent variables were positively related with dependent variable (export trade performance) within the range of 0.329-0.930, were all are significant at $p < 0.01$ level.

Table 4.5 Correlation Analysis between Explanatory Variables and Export Trade Performance

		IF	CP	GH	UC	EP
IF	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	147				
CP	Pearson Correlation	.339**	1			
	Sig. (2-tailed)	.000				
	N	147	147			
GH	Pearson Correlation	.224**	.733**	1		
	Sig. (2-tailed)	.007	.000			
	N	147	147	147		
UC	Pearson Correlation	.281**	.855**	.875**	1	
	Sig. (2-tailed)	.001	.000	.000		
	N	147	147	147	147	
EP	Pearson Correlation	.329**	.927**	.860**	.930**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	147	147	147	147	147

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

Source: SPSS output from survey data, 2024

Infrastructure facilities and export trade performance in Ethiopian international air cargo has a bit moderately positive correlation coefficient which is 0.329 at 0.00 level of significant that leads the Infrastructure facilities of the Ethiopian international cargo have significant association with the export trade performance. So that Infrastructure facilities are one of the predicator of export performance level in international cargo. Ground handling, customs procedure and uncertainties with export trade performance have the highest correlation coefficient of 0.860, 0.927 and 0.930 respectively at 0.00 significant levels. Therefore uncertainties and customs clearance procedure can be the major predicator of level of export performance in Ethiopian international air cargo export.

Sequentially, uncertainties, customs clearance procedure, Ground handling process and lastly Infrastructure facilities in descending order can be the predictor of air cargo export performance in Ethiopian international air cargo due to their relatively higher correlation coefficient.

4.6 Regression Analysis

Multiple linear regression analysis is the most common form of regression which was utilized to investigate the relationship between factors of air cargo export (independent variables) and export performance (dependent variable) or the contribution of each of the independent variables to a single dependent variable. Beside this it is important in determining the strength of predictors and forecasting the effects.

Table 4.6 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.971 ^a	.942	.940	.19624	.942	575.782	4	142	.000	2.170

Source: SPSS output from survey data, 2024

a. Predictors: (Constant), UC, IF, CP, GH

b. Dependent Variable: EP

As it can be seen in the above model summary R= 0.971 which indicates the strong positive relationship between Export performance in Ethiopian international air cargo and explanatory variables (Infrastructure facilities, customs clearance procedure, uncertainties, and Ground handling process) and R-square 0.942 measured how much the percentage of the difference in the dependent variable is explained as a result of the change in the independent variable which are air cargo transports thus R-square also measures the goodness of the fit of those explanatory variables in explaining the variation in export performance as dependent variable. Although, the adjusted R-square value for

the regression model is 0.940 which implies the variables contribution for the export performance in Ethiopian air cargo is 94.0% in this study while the rest 6.0% indicates the variation in the level of export performance are explained by other variables which are not included in the model. 94.0 percent of the variation in the dependent variable is jointly explained by the independent variables.

Table 4.8: ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	88.697	4	22.174	575.782	.000 ^b
	Residual	5.469	142	.039		
	Total	94.165	146			

a. Dependent Variable: EP

b. Predictors: (Constant), UC, IF, CP, GH

As per ANOVA results indicated on above table, there was a statistical significant correlation between dependent and independent variable at 100% significant level due to the sig value 0,000. This reveals that the explanatory variables; Infrastructure facilities, customs clearance procedure, uncertainties, and Ground handling process affects export trade performance. However all factors of Ethiopian international air cargo export have no equal correlation with export performance degree because the outcome of multiple linear regression analysis stated that there is variation in the effect of predictor variables on a single dependent variable.

In terms of F-statistics (575.782) at a significant level of 0.000, which means there is a relationship between air cargo transport factors and export performance among Ethiopian international air cargo.

Table 4.9: Regression coefficient analysis of model

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	-.768	.183		-4.202	.000		
IF	.050	.040	.027	1.249	.244	.883	1.132
CP	.605	.049	.492	12.372	.000	.259	3.865
GH	.242	.044	.230	5.495	.000	.234	4.281
UC	.299	.054	.301	5.496	.000	.137	7.326

Source: SPSS output from survey data, 2024

Based on the above results here can be developed the following regression model

$$EP = -768 + 0.050IF + 0.605CP + 0.242GH + 0.299UC +$$

Where

EP= Export Performance

IF= infrastructure Facilities

CP= Customs Procedure

GH= Ground Handling

UC= Uncertainties

According to the independent variable effect on change of export trade performance level here is the finding up on the results of regression analysis. Infrastructure Facilities with 0.050 coefficients imply that a 100% change in Infrastructure Facilities stands for 5% of

export performance level conversion. Customs Procedure with 0.605 of 100% change which stands for 60.5% export performance. Uncertainties 29.9 % and Lastly Ground Handling with 0.242 of 100% change in export trade performance leads to 24.2% change of the level of export performance.

Based on the findings all significant independent variables have positive relationship with export trade performance at p-value of 0.000 that is significant. Thus, Customs clearance Procedure, Uncertainties, Ground Handling and infrastructure Facilities respectively are the major determinant factors that affect export trade performance.

4.7 Structured Interview Results

Currently Ethiopian airline has 12 freighters Aircrafts 10 B-777 & 2 Boeing 757, this limited number of aircrafts were one of the cause of offload of export goods because most of the time the items prepared to export is greater than the loading capacity of the existing freighter aircrafts. This answer is related to uncertainties. With these limited aircraft, Ethiopian airline has 57 International destinations with cargo, to five continents, Africa, Asia, Europe and the Americans but no domestic dedicated cargo flights, the company only use passenger belly hold depending on space availability.

The frequency of Ethiopian international air cargo flight to different destinations is varied from country to country and week to week and The Company doesn't give rate for export goods rather it is based on the market trend i.e. they do not calculate cost per kilometer. This may cause fluctuation of export costs which affect export trade.

On other word, the existing rate per unit of product especially in cargo planes depends on take-off time, the age of the aircraft and availability of cargo for exporters and other operational parameters on the date of service. Total charge is determined based on maximum load of 36 tons and if the actual load is lower than this, cost per unit increases. So that it is also one of the causes of uncertainties.

According to Ethiopian airlines cargo infrastructure department:

Related to Cargo Terminal facilities: Perishable cold room 4200 m² (For export flower & vegetables storage purpose), Cold room 2835 m² (for export meat & other temperature

sensitive shipments storage purpose), Deep freezer facility 112.26 m² (for shipments to be stored up to -20oc temperature range), Oversize shipment handling warehouse 3300 m², Warehouse for handling different types of cargo shipments 17,000 m² (with proper material euro pallet handling racks & standard ULD handling storage racks)

Loading facilities and unloading facilities: Manually operated pallet Jacks / Wagner's / Fork Lifts Medium Capacity, Fork Lifts Heavy Duty Capacity, Belt Loaders and Scissor Lift. However, compared to the global experience, Ethiopian air cargo has limited unmanned vehicle for loading and unloading process which were one of the cause of delay.

Related to Stakeholder Facilities: Office building (for different stakeholder users) 1600 m² (having 2floor level building), Parking area for different stakeholders & customer's 9000 m² which helps to support stakeholders but there is no agent warehouse around the airport.

Related to Technological infrastructure facilities: there are different equipment's that is important to loading and unloading, Pallet transporting Dollies, Container transporting Dollies, and Baggage handling Carts, Different types cargo material handling conveyor systems (with different design & application), Fully automated ETV (Elevating transfer vehicles) of 7000kg load handling capacity (on ETCT-1 facility there are 2ea ETV machines 1ea for the Dry cargo area & the remaining one for the cold room).

Related to customs clearance procedure, there are long waiting times for customers: due to network problem, bureaucracies by officers, missing of documents and valuation process by itself.

The major factors that hinder air cargo export may bureaucracies at security check, manual examination of goods, bank permit, city traffic congestion, different uncertain problems. However, to facilitate the export trade, customs release goods even with missing of documents with appointment.

According to the interviewee, there were a lot of export goods that offloaded with different causes like weather, security issues, track delay, customs procedure, importers willingness at destination and unavailability of space for goods and size of pallets.

Generally, Air cargo transport is more complex than passenger transport because the former involves more players, more sophisticated processes, a combination of weight and volume, varied priority services, integration and consolidation strategies, and multiple itineraries of a network. In other word many stakeholders are involved in air cargo transport. Thus the failure of one actor is the failure of another. So that weak stakeholder communication and coordination highly affects Ethiopian international air cargo exports performance.

CHAPTER FIVE

5. Summary Findings, Conclusion and Recommendation

4.8 Summary of Findings

Out of 148 questionnaires distributed 147 questionnaires were filled up and returned with response rate of 99%. The center of analysis on the factors affecting air cargo export trade therefore lies basically on this primary data set obtained from Ethiopian international air cargo communities particularly working in cargo export areas.

Before any analysis, the value of Cronbach's Alpha for the entire questionnaire and for major factors was calculated to check the dependability of the research findings. The Cronbach's Alpha statistics for the entire questionnaire is about 0.911 and for each factor that affect air cargo export trade is greater than 0.70 implying that the findings of this research can be reliable or dependable.

i. Results Related Infrastructure facilities

Airports were developed primarily from passenger stand point of view, and thus requirement of cargo facility development was not taken seriously.

The terminal didn't offer separate facilities except cold rooms, Agent warehouse are often located within the city except their office (not close to cargo terminal) and CCTV coverage often limited to specific areas of air cargo complex

The result of descriptive statistics of Ethiopian international air cargo export indicates that the scored mean value and standard deviation of infrastructure facilities are available in Ethiopian air cargo.

The maximum mean score is 4.701 (cargo terminal has enough cold chain facility for temperature sensitive's) and the minimum mean score is obtained from (cargo terminal has automated Technological infrastructure facilities) which has an average mean value of 3.980.

The result of Pearson's correlation coefficient indicates, infrastructure facilities and export trade performance in Ethiopian international air cargo has a bit moderately

positive correlation coefficient which is 0.329 at 0.00 level of significant. So that Infrastructure facilities are one of the predicator of export performance level in international cargo transport.

ii. Results Related to Customs Clearance Procedure

100% of cargo is customs processed through airport terminal that taken long waiting times for customers: so that delay occurs in submission of documents necessary for clearance, network problem, bureaucracies by officers, issue of mis-classification of goods and valuation procedures

The dwell time also increases because of working habits of everyone involved in the process.

Among all the Product/tariff classification issues at customs area affect air cargo export with the maximum mean value of 4.31 and STD of 0.866.

The result of Pearson's correlation coefficient indicates, Customs clearance procedure can be the major predicator of level of export performance in Ethiopian international air cargo export with the second highest correlation coefficient which is 0.927 at 0.01 level of significant. Customs clearance procedure the major cause of delay which results offload of goods.

iii. Results Related to Ground Handling process

Air freight handling in combination with the required documents causes a significant bottleneck in air freight transport

Air freight goods spend around 80% of their time between sender and recipient on the ground.

Unloading and loading facilities were the main cause of delay of freighter aircrafts with the mean score value of 4.15 and standard deviation of 0.814 followed by Flight document preparations with mean value of 3.64.

There were limited unmanned vehicle and better accuracy in handling (Mostly Labour intensive operations in Ethiopian cargo).

iv. Results Related to Uncertainties

Air cargo transport has higher uncertainty than passenger transport in terms of capacity availability.

The quantity of goods to be shipped is a ctual rather than booked orders which were another cause of delay.

The capacity of a passenger aircraft is fixed by its number of seats, cargo capacity depends on the container types. Multiple dimensions are a key feature of freight, which render both complexity and uncertainty to air cargo capacity management.

Capacity availability, adverse weather condition, security problems both in origin and destination are some of a cause of uncertainties that leads to delay and flight cancelation which results offload of export goods.

Limited numbers of aircrafts were one of the causes of offload of export goods because most of the time the items prepared to export is greater than the loading capacity of the existing freighter aircrafts.

Bureaucracies at security check and manual examination of goods also causes of delay of cargo

According to Customs Export Team report, by only two months (Mar 3, 2020-Apr 26, 2020) about 15,233 kg export goods were offloaded due to delay and flight cancelation.

According to EAL cargo section report, performance of goods exported per a year in Ton through Ethiopian airlines were decreased in 2017/18 by 74,340 kg from 2016/17 total uplift. These were due to delay and flight cancelation.

4.9 Conclusions

The study was conducted to assess and the factors affecting air cargo export trade in Ethiopian international air cargo.

The research can help the company to pay attention on the gaps while delivering service

The research methods used were both descriptive and explanatory research methods.

From the finding show that the values of Cronach's Alpha for the entire questionnaire and major factors of air cargo export were very good reliability so the results of this paper are reliable. In addition to this the demographic analysis show that almost male and female were equally engaged, degree holders and youngsters.

According to this study respondents were on average identifies and filled the questions properly about the major problem of Ethiopian international air cargo export trade that is why they were “agreed” about the factors. This signifies that the cargo communities indicate the problems towards the air cargo export to improve export performance and the company strongly works with other stakeholders (airport communities).

Uncertainty, customs procedure and ground handling have the highest correlation coefficient at p-0.00 level of significant with export performance.

Generally from this study concluded that most of major factors that affect Ethiopian international air cargo export (i.e. customs procedure, ground handling and uncertainty) are highly affect the export trade.

Based on the finding, the regression analysis model summary $R= 0.971$ which indicates the positive relationship between independent and dependent variables.

100% of cargo is customs processed through airport terminal that taken long waiting times for customers.

From the finding, Unloading and loading facilities were the main cause of delay of freighter aircrafts with the mean score value of 4.15.

Air cargo transport has higher uncertainty than passenger transport in terms of capacity availability.

4.10 Recommendations

The focus of this thesis was on Ethiopian international air cargo communities that could provide useful insight to both practitioners and researchers. The main goal of this paper was to assess the Factors affecting air cargo export trade; insights based on the perception of employees in Ethiopian international air cargo. Therefore, the researcher recommends on the following issues based on the finding of the study.

For Ethiopian airlines, Airports were developed primarily from passenger stand point of view, and thus requirement of cargo facility development was not taken seriously. Therefore, to increase export cargo performance the case company have to give special emphasis to cargo infrastructure facilities. Belly-hold capacity of passenger aircrafts which severely limits the dimensions and weights of acceptable shipments. Therefore,

the Company should be Increased the number of freighter aircraft to increase the loading capacity and to reduce offloads of export goods

Ensure inter-linkage of all the stakeholders in the export cargo supply chain to create strong communication and network to facilitate export trade.

Increase in productivity by reducing loading and unloading time, through unmanned vehicle and better accuracy in handling and Increase personal qualifications level in the ground handling area.

Even if the Ethiopian airline is a business company it should be allowed to researchers to explore new insights in the area.

Inclusive planning and timely implementation of setting up for air cargo operations at and off airports with full facilitation to achieve greater throughput efficiency, reduced dwell time and maximization of the installation capacity

For Customs Commission will take the following measures to reduce delay in processing of Export Cargo:

All export clearance must be done online at Customers premises rather than being processed at the airport. Customs system should be able to identify export package meant for examination and those that are not to be examined, so that they can directly be moved to warehouse for built up.

Expeditious export clearance on self-declaration basis and post audit instead of waiting for export documentation to be completed which is dependent on multiple processing at various levels.

For exporters, International agreement between exporter and importer should be formulated to minimize sudden flight cancelation or offload of goods at the eleventh hour.

For government, as Ethiopian airline is 100% owned by the government of Ethiopia, contribute its own side to a company in order to increase the number of aircrafts and to separate Passenger and cargo aircraft to get available space for export goods.

The contribution of air cargo sector needs to be adequately and appropriately recognized so that Ethiopia fast growing International trade by air is facilitated, enabled, integrated and expanded.

Establish an integrated mechanism which will enable collaboration amongst key stakeholders and act as an enabler for efficient investment in the creation and operation of air cargo logistic infrastructures including appropriate rail and road links to feed air transport.

4.11 Further Implications

The research can be further expanded to other countries and cultures. It would help to understand in detail different factors influencing air cargo export trade. 'Moreover by using a larger and diverse sample size and even distribution among different age group helps to better understanding of international air cargo export.

Further studies can be carried out on the factors that affect air cargo export to enhance export trade performance of the company and the country as a whole.

Finally, since the study only cased studied on air cargo exports. A survey on both imports and export as well as passenger transport would be an effective research.

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Appendix I: Questionnaires

Addis Ababa University

Msc. In international Business

Dear Respondent,

I am pleased to inform you that a graduate student at Addis Ababa University pursuing Msc in International Business. As partial fulfilment of graduation, I am conducting a research on the factors that affect air cargo export trade performance. The study uses Ethiopian international air cargo as a case study. My research thesis is targeted to create knowledge to be utilized in understanding the factors of air cargo export trade performance. As a representative of your office, your views are of important in my study and I would like to ask you responding to this questionnaire. The main aim of this study is academic purpose and your response will be kept confidential.

Note: you are not required to write your name.

Thank you for your time, co-operation and contribution.

Yours faithfully!!

The Researcher

PART –I Background information of the respondent (for all respondents)

Please put a tick (√) mark where you think is appropriate in the box provided.

1	General information/item	Option/dimension	Put (√)
1.1	Gender	Male	
		Female	
1.2	Age	20-30 years	
		31-40	

		41-50	
		51-60	
		above 60	
1.3	Educational Level	Below diploma	
		Diploma	
		Degree	
		Masters and above	
1.4	Work Experience	1-3 Years	
		4-7 Years	
		8-11 Years	
		12 & above Years	

PART –II Please kindly, **indicate** (√) your level of agreement (perception) with the following statements regarding air cargo transport delay on export trade by choosing from a scale of 1-5, where by 1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree.

2	Infrastructural Facilities	1	2	3	4	5
2.1	The Ethiopian air cargo has enough normal size shipment handling warehouse					
2.2	The Ethiopian air cargo has enough Oversize shipment handling warehouse					
2.3	The Ethiopian air cargo has enough Parking facility for both					

	landside and airside					
2.4	cargo terminal has automated Technological infrastructure facilities					
2.5	cargo terminal has enough cold chain facility for temperature sensitive's					
3	Ground Handling Process	1	2	3	4	5
3.1	Ground power supply / refuelling time affects air cargo export					
3.2	Unloading or loading facilities time affects air cargo export					
3.3	Air traffic control restriction affects air cargo export					
3.4	Technical maintenance of the aircraft affects air cargo export					
3.5	Flight document preparations affects air cargo export					
3	Customs Clearance Procedure	1	2	3	4	5
3.1	Product/tariff classification issues at customs area affect air cargo export					
3.2	Missing/error in documents affects air cargo export					
3.3	physical inspection of goods at customs area affect air cargo export					
3.4	valuation of customs procedures affects air cargo export					
4	Uncertainty	1	2	3	4	5
4.1	Capacity availability Affects air cargo export					
4.2	The oversized shipment affect air cargo export					
4.3	Security problems both in origin and destination affect air cargo export.					

4.4	Adverse weather conditions affect air cargo export.					
5	Air Cargo Export Performance	1	2	3	4	5
5.1	Infrastructural Facilities affects export performance					
5.2	Customs procedure affects export performance					
5.3	Ground handling affects export performance					
5.4	Uncertainty affects air cargo export performance					

Part IV: Structured Interview

How many cargo aircrafts does the Ethiopian airline have?

How many domestic and international destinations with cargo?

How frequent is the air cargo flight to different destinations?

What is the cost of exporting goods per kilometre?

How many ton of goods exported per a year?

What are the major factors that causes of aircraft delay?

Is there any offload of export goods? Why?

How the existing air cargo infrastructure in Ethiopian airlines does looks like?

- a. Cargo Terminal facilities
- b. Loading facilities and unloading facilities.
- c. Stakeholder Facilities
- d. Technological infrastructure facilities

What are major factors that affect air cargo export?

How customs facilitate the export trade?

Why export goods offloaded?

N.B: All interview questions will asked for managers of Ethiopian airlines & customs commission

Thank you!

Appendix II: SPSS Results

Frequency Table

Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	99	67.3	67.3	67.3
2	48	32.7	32.7	100.0
Total	147	100.0	100.0	

Age

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	25	3.4	17.0	3.4
2	63	42.9	42.9	46.3
3	54	36.7	36.7	83.0
4	5	17.0	3.4	100.0
Total	147	100.0	100.0	

E.Q

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 3	50	34.0	34.0	50.3
4	73	49.7	49.7	16.3
5	24	16.3	16.3	100.0
Total	147	100.0	100.0	

Scale: Infra reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.815	6

Item Statistics

	Mean	Std. Deviation	N
IF1	4.571	.4966	147
IF2	4.571	.4966	147
IF3	4.571	.4966	147
IF4	4.571	.4966	147
IF5	4.701	.4595	147
IF6	3.980	.9614	147

Scale: customs pro reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.754	5

Item Statistics

	Mean	Std. Deviation	N
CP1	4.31	.866	147
CP2	3.98	.961	147
CP3	4.13	.846	147
CP4	3.71	1.129	147
CP5	4.18	.747	147

Scale: Ground handling reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.785	5

Item Statistics

	Mean	Std. Deviation	N
GH1	4.15	.814	147
GH2	3.61	1.168	147
GH3	3.56	.966	147
GH4	3.49	.996	147
GH5	3.64	1.240	147

Scale: uncertainty reliability**Reliability Statistics**

Cronbach's Alpha	N of Items
.836	5

Item Statistics

	Mean	Std. Deviation	N
UC1	3.71	1.129	147
UC2	4.15	.814	147
UC3	3.51	1.230	147
UC4	3.51	.989	147
UC5	3.52	.982	147

Correlations

		IF	CP	GH	UC	EP
IF	Pearson Correlation	1	.339**	.224**	.281**	.329**
	Sig. (2-tailed)		.000	.007	.001	.000
	N	147	147	147	147	147
CP	Pearson Correlation	.339**	1	.733**	.855**	.927**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	147	147	147	147	147
GH	Pearson Correlation	.224**	.733**	1	.875**	.860**
	Sig. (2-tailed)	.007	.000		.000	.000
	N	147	147	147	147	147
UC	Pearson Correlation	.281**	.855**	.875**	1	.930**
	Sig. (2-tailed)	.001	.000	.000		.000
	N	147	147	147	147	147
EP	Pearson Correlation	.329**	.927**	.860**	.930**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	147	147	147	147	147

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

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.971 ^a	.942	.940	.19624	.942	575.782	4	142	.000	2.170

a. Predictors: (Constant), UC, IF, CP, GH

b. Dependent Variable: EP

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	88.697	4	22.174	575.782	.000 ^b
	Residual	5.469	142	.039		
	Total	94.165	146			

a. Dependent Variable: EP

b. Predictors: (Constant), UC, IF, CP, GH

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.768	.183		-4.202	.000		
	IF	.050	.040	.027	1.249	.244	.883	1.132
	CP	.605	.049	.492	12.372	.000	.259	3.865
	GH	.242	.044	.230	5.495	.000	.234	4.281
	UC	.299	.054	.301	5.496	.000	.137	7.326

Reliability Statistics of Export performance

Reliability Statistics

Cronbach's Alpha	N of Items
.868	5

Item Statistics

	Mean	Std. Deviation	N
EP1	3.97	.958	147
EP2	4.12	.843	147
EP3	3.71	1.129	147
EP4	4.15	.814	147
EP5	3.61	1.168	147

Scale: total reliability

Reliability Statistics

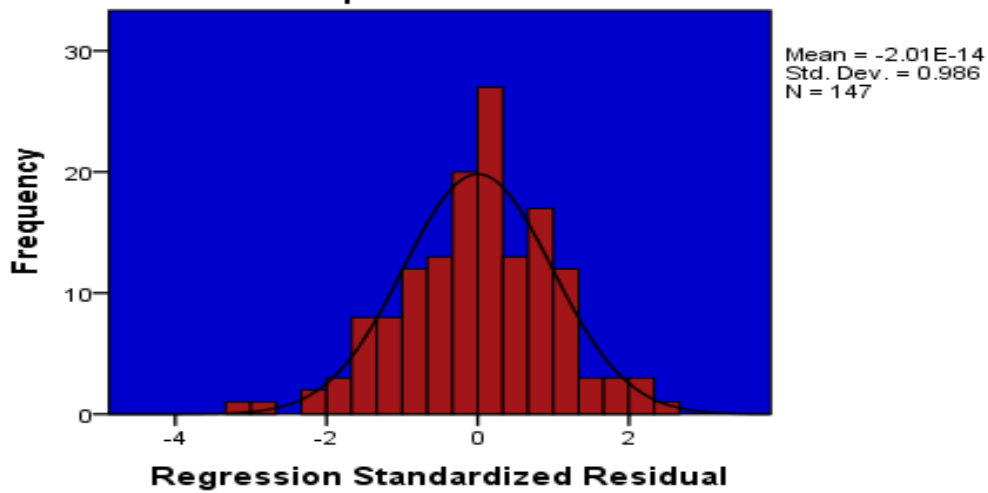
Cronbach's Alpha	N of Items
.911	5

Item Statistics

	Mean	Std. Deviation	N
IF	4.4943	.42845	147
CP	4.0626	.65241	147
GH	3.6884	.76324	147
UC	3.6803	.80670	147
EP	3.9129	.80310	147

Histogram

Dependent Variable: EP



Normal P-P Plot of Regression Standardized Residual
Dependent Variable: EP

