



FACTORS AFFECTING THE PERFORMANCE OF HUMANITARIAN LOGISTICS

THE CASE OF IRC ETHIOPIA

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Declaration

This research project is my original work and has not been submitted for examination to any other university.

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Statement of certification

This investigation, entitled “*FACTORS AFFECTING THE PERFORMANCE OF HUMANITARIAN LOGISTICS, the case of IRC Ethiopia*” was carried by **Demeke Wolde katimo** so as to obtain his second degree from Addis Ababa University School of commerce. He conducted his original thesis under my guidance and supervision. I certify that, the study is his own original work and suitable for submission of the award of MA in Logistics and supply chain Management.

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Dedication

To IRC (International Rescue Committee) Ethiopia for allowing me conduct the research and all the facilitation owed in this regard. Above all, to the humanitarian workers who have given their life and everything in advancing services to the humanitarian works.

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List of abbreviations

ADF	Adequate Donors Fund
APS	Adequate Professional Staff
AUIT	Adequate Use of IT
ESF	Environmental Situational factor
GSF	Government Situational Factor
IL	Institutional Learning
IRC	International Rescue Committee
ISF	Infrastructural Situational factor
PoHL	Performance of Humanitarian Logistics
RoL	Recognition of Logistics
SC	Sufficient Collaboration
SESF	Socioeconomic Situational Factor
WFP	World Food Program
WHO	World Health Organization

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Abstract

A well-managed and effective logistics is central to any disaster response. Humanitarian logistics is the back bone of any emergency support and plays key roles in rendering relief aid services to the disaster affected people yet it is challenged by various factors. Previous studies undergone content analysis and identified four major factors and suggested case studies and survey methodologies in order to learn the statistical effect of these factors on performance of humanitarian logistics. Accordingly, this study is the first to combine internal & external factors together and examine their effects using survey data analyzed through empirical study and identified seven statistically significant variables both from internal & external factors. The factors are listed in descending order from highest to lowest as: donors' funds, environmental situational factors, professional staff, infrastructure situational factors, socioeconomic situational factors, Institutional learning and government situational factors. Moreover, so far, these variables were not investigated in the IRC Ethiopia context and hence this study is the first and the original in the case of this organization. Based on the findings it was recommended that IRC Ethiopia to consider: allocating adequate funds for long term logistics infrastructures and systems as well as for long term disaster preparedness, prepare for challenges of rain season transportation through heavy duty four wheel drive trucks or liaising with partner organization which have air plane facilities , increase capacity of logisticians through secondment and advanced field training, continue investing on backups for utilities, changing view of suppliers from transactional to collaborative, increasing partnership with the government both at regional and federal level and make records of failure or success stories of past logistics experiences and performances. Finally, this study has filled to important research gaps:

- The empirical methodological gap that previous studies have failed but suggested to, and*
- Assessment of the current situation in the effect of logistics performance and its associated factors at IRC Ethiopia.*

Key words: humanitarian logistics, internal factors, external factors, performance of humanitarian logistics

CHAPTER ONE: INTRODUCTION

1.1. Background of the study

Ten years ago, it was forecasted by Thomas & Kopczak (2005) that both natural and man-made disasters would increase by five-fold over the next fifty years. According to the Disasters Report (2009), more than 7000 disasters occurred between the years 1999 and 2008 and caused 1.2 million deaths and 2.7 trillion people affected in the world. Consequently, Humanitarian logistics has received growing interest both from logistics academics and practitioners (Kovacs & Spens 2007) due to its significant contribution to the efficiency and effectiveness of humanitarian operations (Thomas & Kopczak 2005; Tomasini & Wassenhove 2009). For instance, in recent times, the field of humanitarian logistics has got a wider range of research attention aimed at improving the ability of national and international communities to meet the challenges of preparing for, and responding to, natural and man-made disasters (Tatham & Pettit 2010). However, Similar to logistics in the corporate sector in the 1980s, the logistics function in the humanitarian sector is under-recognized, under-utilized and under-resourced (Thomas & Kopczak 2005).

When coming to Ethiopia 50 million of its populations are presently exposed to unknown levels of risk from volcanic activity for they are living in a close proximity to 49 highest category hazard uncertainty volcanos (Aspinall et al. 2011). Kinde (2002) has also indicated that Ethiopia has been experiencing earthquakes and will continue experiencing the same on its different cities including Addis Ababa. On the other hand, flood has been another threat in many regions of the country. For instance, it was reported by Global health action (2009) that the four rivers around Gambella (Baro, Akobo, Gilo, and Alwero rivers) have been causing floods for several years to Gambella people and caused so many casualties in the region. According to Horn affairs report (2015) The resent phenomena which is caused by El Nino effect is worst of the past decades for the number of people in need of relief assistance in Ethiopia had increased to 8.2 million. This is further witnessed by the government that the country is characterized by a drought and famine which killed thousands and affected millions of people. In order for the development of relief

transport and logistics co-ordination in the country, Disaster prevention and preparedness commission (DPPC) has deployed its effort to developing a logistics master plan as well as infrastructural development such as: warehouse, and establishment of a well networked logistics information system. However, coupled by the poor infrastructure in the country, full reliance on the private sector for the transport of emergency relief is found risky as some of the disaster prone areas are not easily accessible, and hence, are not attractive to private transporters (Embassy of The Federal Democratic Republic of Ethiopia 2015). Such basic infrastructures in many developing regions of the world are weak to begin with and get quickly overwhelmed when disaster strikes (Altay, Prasad & Sounderpandian 2009). In order to address such challenges good and more empirical researches need to be done in developing countries and by the researchers from these countries (Kovacs & Spens 2011).

This research therefore sought to examine associated factors affecting performance of humanitarian logistics in the case of International Rescue Committee (IRC) Ethiopia and finally put forward recommendations so that IRC will act on to reduce the suffering of its beneficiaries or affected population.

1.2. Statement of the problem

According to Disasters Report (2009), around the globe, between the years 1999 and 2008, more than 7000 disasters occurred, caused 1.2 million deaths, and affected 2.7 trillion people. Such a tragedy would increase by five-fold in the next fifty years as forecasted by (Thomas & Kopczak 2005).

Natural and man-made disasters are affecting millions of people worldwide and the existence of these people depends on disaster relief assistance provided by governments and international relief organizations (Kunz et al. 2013). As per the survey of Fritz Institute (2005) pertaining the Indian Ocean tsunami of 2004, it was proved that logistics is central to humanitarian aid. Trunick (2005) has also agreed that logistics has always been an important factor in humanitarian aid operations as its efforts account for 80 percent of the cost of disaster relief.

As per the survey done by Thomas & Kopczak (2005) on humanitarian logisticians participated towards the support of people afflicted by Indian ocean tsunami, the five major challenges facing humanitarian logistics were identified as: Lack of recognition of logistics, Lack of professional staff, In-adequate use of technology, Lack of institutional learning and Limited collaboration; however, their effect on performance of logistics not empirically studied.

Wassenhove (2006) has also argued that lack of adequate funds for logistics training and procedures will lead to poorer logistics performance though the magnitude of its effect not indicated.

On the other hand, Kunz & Reiner (2012), through content analysis of various literatures, have identified four major situational factors affecting performance of humanitarian logistics such as: Environmental situational factors, Governmental situational factors, Socio-economic situational factors and Infrastructural situational factors. However, these authors strongly suggested case studies and survey methodologies be increasingly used in order to gain an empirical knowledge.

Recent study by Leeuw & Klumpp (2014) showed that measuring performance would increase performance of humanitarian logistics; however, the extent not statistically studied.

Furthermore, some internal sources from IRC Ethiopia confirmed that their logistics performance is being affected by both external and internal factors. For instance, delays in customs clearing process, pressures to hire personnel from local communities, poor road infrastructure, and limited funds for establishment of long term logistics capabilities, lack of standard trainings, staff turnover and limited collaboration are among other factors affecting performance of their logistics.

As far as knowledge of the investigator is concerned, no study was conducted in the area of factors affecting logistics performance at IRC Ethiopia, and none of the former studies

empirically showed the cause and effect relationship between the eleven associated factors affecting performance of humanitarian logistics.

This is further ascertained by Kovacs & Spens (2011) that there are no adequate empirical studies carried on humanitarian logistics, so therefore, suggested empirical researches to be done in developing countries and by the researchers from these countries.

Accordingly, as opposed to previous research works such as content analysis of varied literatures, this research deployed empirical study and sought to fill the empirical gap that no former researches have been done so far.

1.3. Objective of the study

1.3.1. General objectives

To examine the antecedents of humanitarian logistics performance at IRC Ethiopia, 2015.

1.3.2. Specific objectives

- To examine the effect of internal factors on performance of humanitarian logistics.
- To examine the effect of external factors on performance of humanitarian logistics.

1.4. Research questions

1. How do internal factors affect performance of humanitarian logistics?
2. How do external factors affect performance of humanitarian logistics?

1.5. Significance of the study

As this research has examined humanitarian logistics problems and possible strategic solutions, first, it gives an insight of strategic preparedness to all stake holders working with International Rescue Committee. To mention few of these beneficiaries: federal, regional and local governments, international and local NGOs, donors and other international agencies. Second, it gave directions for further researchers who want to focus on studying the challenges of humanitarian logistics in the 3rd world countries like Ethiopia. Last but not least, to the relief beneficiaries to it that their sufferings associated with natural and man-made disasters get reduced.

1.6. Limitation and scope of the study

The study was carried out at IRC Ethiopia both at its head office located at Addis Ababa and the rest of all sub offices situated in different regions of Ethiopia. For instance, from the Northern region IRC Ethiopia has offices in Tigray and logisticians from Shire field office and Shimelba

refugee program were considered in the study. Same wise, IRC Ethiopia's logicians from Eastern region (Somali) Western region (Gambella & Benishangul) Southern region (Sidama, hadiya & Kembata) were considered. The study was carried out solely in IRC Ethiopia using cross sectional data (one time data) collected during the period of October through November 2015.

1.7. Definition of operational terms

- **Humanitarian Logistics:** Humanitarian Logistics is the processes and systems involved in mobilizing people, resources, skills and knowledge to help vulnerable people affected by natural disasters and complex emergencies. Humanitarian logistics encompasses a range of activities, including procurement, transport, tracking and tracing, customs clearance, local transportation, warehousing and last mile delivery. Humanitarian logistics is vital for the performance of both current and future humanitarian operations and programs as it plays three key roles. First, it enables major humanitarian programs (such as: health, food, shelter, water and sanitation) to give efficient and effective response; second, it's the most expensive part of relief operation; third, the logistics department may have bunches of data that can be analyzed for post-event learning such as effectiveness of suppliers & other service providers, cost information & the rightness of response and appropriateness of donated goods (Thomas & Kopczak 2005).
- **Internal organizational factors:** factors very endemic to the organization itself and can be affected or intervened or improved (Kunz & Reiner 2012).
- **External situational factors:** factors that cannot be changed or affected but a given organization can adopt and cop up with them (Kunz & Reiner 2012).
- **Performance of humanitarian Logistics:** the ability of a humanitarian logistics to deliver humanitarian needs thereby alleviate the suffering of beneficiaries.
- **Performance measurement:** is the process to quantify the efficiency and effectiveness of an operation (Beamon & Balcik 2008).
- **Resource metrics:** measure the level of resources used to meet the system's objectives (Beamon & Balcik 2008).

- **Output metrics:** measure the effectiveness with which supply chains are able to supply (Beamon & Balcik 2008).
- **Flexibility/reliability metrics:** measure the ability of an organization to respond to different magnitudes of disasters in terms of volume flexibility, delivery flexibility and mix flexibility (Beamon & Balcik 2008).

CHAPTER TWO: LITERATURE REVIEW

Operational issues encountered in humanitarian logistics are indicative of wider issues affecting humanitarian organizations (Christopher & Sandwell 2011). These issues are further detailed down from the perspective of wider literatures and discussed herein under.

2.1. Lack of recognition

For several years, humanitarian logistics lacks recognition resulting in unmet logistics requirements. For instance, logisticians are not included in planning and budgetary processes (Wassenhove 2006). Moreover, logisticians are often not consulted in the decision making process and hence some of the logistics bottlenecks are not anticipated and planned for, causing unnecessary delays in delivering relief (Fritz Institute 2005). Contrarily, Kovacs & Spens (2009) underlined that lack of recognition of logistics is no longer significant challenge in humanitarian logistics in Africa.

H1. Recognition of logistics positively affects the performance of humanitarian logistics.

2.2. Lack of professional staff

Lack of available humanitarian logisticians is another important challenge facing humanitarian logistics. For instance, Tsunami relief supports were negatively impacted by the lack of available trained and experienced field logisticians (Fritz Institute 2005). This is further underlined by Telford & Cosgrove (2007) that many NGOs have limited capacity of allocating appropriately experienced logisticians who can operate in an emergency at an international level. Consequently, Kovacs & Spens (2011) echoed a need for establishment of humanitarian-academic partnerships to improve training, education, as well as research to improve on logistics practices. Accordingly, Kovacs, Tatham & Larson (2012) suggested competencies that are deemed relevant for the future logistics managers such as: General, Finance, IT, Logistics specific, Management/strategy, Operations, Supply chain management, Focus on processes/flows, Legal, security and international trade, Multimodal logistics, Logistics in emerging markets, Competencies/skills, Analytical, Interpersonal, Leadership, Change management and Project management.

H2. Availability of Professional Staff positively affects the performance of humanitarian logistics.

2.3. Inadequate use of technology

Inadequate use of technology is also an important bottleneck for performance of humanitarian logistics. Even though the effectiveness of the information system is a key determinant of success of a humanitarian logistic and supply chain (Long & Wood 1995), information systems put in place to help meet emergency program requirements may be very incomplete, ineffective or inefficient (Maxwell & Watkins 2003).

According to Fritz institute (2005), the logistics and supply chain management of humanitarian sector is still largely manual as the majority of logisticians had no access to any tracking and tracing software. However, logistics data can provide a valuable end-to-end view on the effectiveness and efficiency of an operation thereby enable post-event learning (Thomas & Kopczak 2005).

H3. Adequate Use of Information Technology has positive effects on the performance of humanitarian logistics.

2.4. Lack of institutional learning

The tacit nature of the humanitarian logistics skills and the assignment of field logisticians to other relief operations give birth to lack of institutional learning. As a result, the lesson learned in one relief operation could not be passed on to other logisticians of a given organization (Fritz Institute 2005). Deployment of secondees from nine different organizations to support the relief of Hurricane Nargis in Burma in 2008 (UNJLC 2008a) can witness staff turn-over in the humanitarian sector. On the other hand, according to Chandes & Pache (2010), lack of real career path for field logisticians and the stressful nature of the work of humanitarian logistics are to be blamed for such a huge staff turnover.

Logistics staff turnover accounts 80% annually (Fritz Institute 2005), and this in turn hampered the ability of international agencies to build and maintain institutional memory and contextual knowledge (Telford & Cosgrove, 2007). And hence, it can be argued that organizing, analyzing and sharing the lessons learnt within a particular NGO as well as across the NGO community would have a considerable benefit (Tatham & Spens 2011).

H4. Institutional Learning positively affects the performance of humanitarian logistics.

2.5. Lack of collaboration

A well-managed and long-term relationship with customers and suppliers will lead to high performance of supply chain (Chin, Tat, Yusoff & Rasli 2010).

Despite the fact that effective and efficient operation of a supply chain depends on successful management of internal and external relationships (Christopher 2005), it was pointed out by Fritz institute (2005) that there was lack of collaboration among logisticians of various humanitarian aid organizations. Besides, Grant (2007) showed that there have been abundant forms being used by different NGOs during needs assessment process where so little agreement reached over the data to be captured. This is further underlined by Telford & Cosgrove (2007) that in the 2004 Asian tsunami multiple NGOs conducted assessments but rarely shared resources and information among each other. Beamon & Kotleba (2006) suggested that many organizations developed their own procedures independently of other organizations as logistics practices were not fully accepted as universal and cross-organizational. Apparently, there has been an increase demand for multi-agency collaboration since 1999s yet NGOs are in direct competition for donor funding and other resources such as warehousing and vehicle fleet (Beamon & Kotleba 2006; Fritz institute 2005). Moreover, Chandes & Pache (2010) emphasized that lack of coordination affects performance of humanitarian logistics operations and actors from this sector need to engage in collective action for achieving positive impact on their logistics performance. Contrarily, Kovacs & Spens (2009) depicted that lack of collaboration has already been addressed and no longer be a significant challenge to humanitarian logistics in Africa.

H5. Adequate Collaboration positively affects the performance of humanitarian logistics.

2.6. Performance measurement

Measuring and managing performance is crucial for an efficient and effective humanitarian supply chain (Leeuw & Klumpp 2014). For instance, Performance of the relief chains would be improved through effective performance measurement systems (Beamon & Balcik 2008). An organization that measures its performance can build and retain knowledge, and rapidly demonstrate systematic and measurable improvements (Whiting & Ostrom 2009).

Modifying commercial supply chain performance metrics, Beamon & Balcik (2008) suggested relief aid performance measurement system from three dimensions namely: resource metrics, output metrics and flexibility metrics. The authors underlined that organizations may have different performance measurement system but must incorporate at least one or two elements of metrics from each of the three dimensions.

H6. Performance of humanitarian logistics is positively affected by measuring its performance.

2.7. Situational factors

According to Kunz & Reiner (2012), infrastructural, political, environmental and socio-economic factors are the four situational factors affecting performance of humanitarian logistics. These authors defined situational factors as exogenous contextual variables which are present in the disaster-affected area and impact the performance of humanitarian logistics.

2.7.1. Government situational factors

According to Kunz & Reiner (2012), ineffective and illegitimate regime imposes restrictions on relief supply chains. For example, the Zambian president Levy Mwanawasa considered genetically modified food as poison and banned donations while the food was confirmed safe for human consumption by WHO, WFP and FAO (Tomasini & Wassenhove 2004). Kunz & Reiner (2012) depicted that type of regime, the national regulations toward relief organizations, the efficiency of the state, the level of corruption and customs clearance are among many other government factors affecting performance of humanitarian logistics. Furthermore, Political instability in East Africa has slow down the relief effort in the region (Choi et al. 2010). The security context in a country is also dependent from the government (or its absence), and strongly impacts the performance of the logistics response (Long & Wood, 1995).

H7. Suitability of government situational factors positively affect performance of humanitarian logistics.

2.7.2. Infrastructural Situational Factor

Humanitarian logistics operates in such areas where difficult to reach under normal circumstances because roads are often inadequate. Humanitarians need robust equipment that can

be set up and dismantled quickly enabling them to be extremely adaptable and prepared for the unexpected circumstances. Unfortunately, logisticians in this sector often have to work with fragmented technology and poorly defined manual processes (Wassenhove 2006). This has been very common in the region of East Africa which suffers from fragile physical logistics systems such as: poor road surfaces, unstable rail track bedding and weak bridges (Choi, et al. 2010).

H8. Suitability of infrastructural situational factors positively affect performance of humanitarian logistics.

2.7.3. Socio-economic Situational Factor

Availability of local suppliers, literacy level of the society, type of market economy, the local culture and religion, are among other Socio-economic situational factors which affect the performance of humanitarian logistics (Altay et al. 2009; Dowty & Wallace 2010; Kandiyoti 2007; Leon et al. 2009; Maon et al. 2009). In a well-developed economy, some important items can be purchased from local suppliers, and personnel can be employed locally for logistical activities. In a less developed economies, volatile operating conditions such as fluctuating freight rates and unpredictable transit schedules are prevalent. Besides, all supplies have to be imported and most tasks must be managed by expatriate staff (Kunz & Reiner 2012; Choi et al. 2010).

H9. Suitability of socioeconomic situational factors positively affect performance of humanitarian logistics.

2.7.4. Environmental situational factors

As can be viewed from the content analysis done by Kunz & Reiner (2012) on various literatures, Weather, topography, geography, vegetation, presence of water, effects of climate change are among other environmental situational factors impacting performance of humanitarian logistics. According to Altay et al. (2009), some disasters such as hurricanes and wild fires can be predictable to a certain degree yet a common and difficult task at this stage is evacuation for an incorrect evacuation decision would be devastating and highly regrettable. Disasters are unpredictable and often occur in developing countries (Nollet et al. 1994). For instance, the volcano risk assessment of Aspinall et al. (2011) indicated that 50 million of the

Ethiopian populations are presently exposed to unknown levels of risk from volcanic activity for they are living in a close proximity to 49 highest category hazard uncertainty volcanos. Kinde (2002) has also indicated that Ethiopia has been experiencing earthquakes will continue experiencing the same on its different cities including Addis Ababa. On the other hand, flood has been another threat in many regions of the country. For instance, the four rivers around Gambella (Baro, Akobo, Gilo, and Alwero rivers) have been causing floods for several years to Gambella people and caused so many casualties in the region (Global health action 2009). The recent phenomena which is caused by El Nino effect is worst of the past decades for the number of people in need of relief assistance in Ethiopia had increased to 8.2 million (Horn affairs report 2015).

H10. Suitability of environmental situational factors positively affect performance of humanitarian logistics.

2.8. Lack of donors funding

Accordingly to Thomas & Kopczak (2005), huge portion of funds are allocated for direct relief but so insufficient for logistic strategic preparedness and investment on infrastructures and systems development. This is further ascertained by Wassenhove (2006) that many humanitarian organizations have no adequate funds to finance the training and procedures that will lead to better preparedness and therefore more effective logistical operations. This is also supported by Maon, Lindgreen & Vanhamme (2009) that, organizations, which receive funds for short term relief aids, don't have flexible funds to invest on long term development and implementation of more sophisticated SCM tools such as sourcing, purchasing, and inventory pre-positioning. Hence, they are engaged in specific field projects and often suffer from adopting a strategic posture. Despite the lack of funding, unsolicited donations are one of the main causes of bottlenecks in disasters. Another authors Stapleton, Wassenhove & Tomasini (2010) underlined that in-kind donations cause delays and waste of valuable resources including warehousing space.

H11. Sufficiency of donors funding positively affect performance of humanitarian logistics.

Conceptual Frame work

Independent Variables



Dependent variable

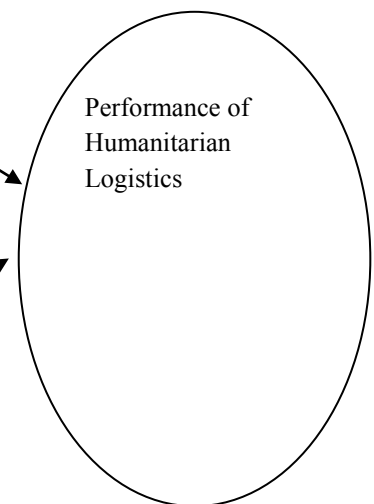


Figure 1. Conceptual frame work adapted from (Kunz & Reiner 2012; Thomas & Kopczak 2005; Beamon & Balcik 2008; Wassenhove 2006).

CHAPTER THREE: METHODOLOGY

Research methodology is a way to systematically solve the research problem. It may be assumed as a science of studying how research is done scientifically. In it, we study the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them. It answers important questions as: why a research study has been undertaken, how the research problem has been defined, in what way and why the hypothesis has been formulated, what data have been collected and what particular method has been adopted, why particular technique of analyzing data has been used. The scope of research methodology is wider than that of research methods. For instance, research methodology has many dimensions and research methods do constitute a part of the research methodology. Research methods or techniques refer to the methods used in performing research operations. In other words, all those methods which are used during the course of studying research problem are termed as research methods. Research methods are those methods which are concerned with the collection of data and the analytical tools of research statistical techniques which are used for establishing relationships between the data to evaluate the accuracy of the results (Kothari 2004).

3.1. Study area and Period

The study was conducted in International Rescue Committee during the period October through November 2015. The International Rescue Committee (IRC) an international for non-profit humanitarian organization which responds to the world's worst humanitarian crises and helps people to survive and rebuild their lives. Founded in 1933, the IRC offers lifesaving care and life-changing assistance to refugees forced to flee from war or disaster.

The IRC has been working in Ethiopia since 2000 GC, currently working in six regions in providing relief services to refugees, victims of drought, and war affected populations (www.rescue.org/ethiopia).

All workers in International Rescue Committee were source population. All logisticians who were working in logistics department from assistant to senior manager position were target of the study. All logisticians and supply chain management staff who have served the organization for at least for one year were included to participate in the study. However, below three bullet pointed staff were excluded from participating in the study.

- Those who were not available during the data collection time.
- Those who were seriously ill and need immediate medical needs.
- Those who were not cooperative to participate in the study

3.2. Study design

A causal research design can be used for studying a cause and effect relationship between dependent and independent variables and regression analysis (whether simple or multiple) is termed as causal analysis between two or more variables. In quantitative studies, researchers advance the relationship among variables and pose this in terms of questions or hypotheses. Quantitative research is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. A case study method can deploy cross sectional data collection technique in a given organization or organizations (Kothari 2004). Hence, the study chosen to use Multiple Regression to analyze cause-effect relationship of variables and it also used descriptive statistics to discover issues that would not be covered by the regression model. The study has also run the cross tab in order to examine the differences among respondent groups.

With regard to sampling method, the study did not undertake rigorous statistical sample size calculation rather considered census method due to the limited population size of the study.

Based on the research conceptual model addressed in the literature review section, 11 constructs were determined as associated factors affecting performance of humanitarian logistics. 35 items from 11 constructs were obtained from the literature and of which questioner was adapted. The questionnaire consisted of four sections so as to cover objectives of the research including:

introduction, respondents' profile, associated factors affecting performance and performance of humanitarian logistics. An organization based case study cross-sectional study design using quantitative methods of data collection was employed. According to (Kothari 2004) questionnaires can be mailed to the respondents with a request to return after completing the same. It is the most extensively used method in various economic and business surveys. Before applying this method, usually a Pilot Study for testing the questionnaire needs to be conducted to reveal the weaknesses, if any, of the questionnaire. Questionnaire to be used must be prepared very carefully so that it may prove to be effective in collecting the relevant information.

To determine the performance of humanitarian logistics, 7 items adapted from (Beamon & Balcik 2008) were selected. The questioner, therefore, in total has had 12 constructs and 42 items. Moreover, 2 redundant items were intentionally put in the questioner for data cleaning purpose.

A five-point Likert scale was used to ask respondents for scoring items ranging from 1 =To no extent to 5 = To a very great extent. The pilot test was conducted on 27 respondents to ensure that the survey instrument is easy to understand by the respondents. This number was found sufficient to run pilot test as it was suggested by Cooper & Schindler (2013) that a minimum number of respondents for the purpose of pilot test would be 25. Modification of the questions was done based on the experts' advice and respondents' feedback to increase reliability of the instrument. The investigator waited three months after conducting the Pilot test so as to avoid contamination of data for the main research. Finally, Structured and pre-tested questionnaire was attached to emails of the respected participants and collected using self-administered ways.

3.3. Ethical consideration and an informed consent

The investigator has secured a letter from the university to the International Rescue Committee so that logisticians of the organization would freely participate in the study. In addition, the investigator has kept the information confidential in order to further protect the participants.

An informed consent to participate in the study was secured before providing the questionnaires. Participants were informed that they had a full right to refuse or discontinue participating and the information they provided would be used for academic purpose only.

3.4. Data analysis

According to Kothari (2004), if data are not properly organized, the researcher may face difficulty while analyzing their meaning later on. For this purpose the data must be coded. Hence, first of all, attention was paid toward data organization and coding prior to the input stage of data analysis; categorical data were given a number to represent them. For instance, regarding sex, 1 was given for male and 0 for female; regarding qualification, numbers 1, 2, 3, 4 represented Masters of Arts Degree, bachelor degree, Diploma and certificate, respectively.

Secondly, Data was entered in to SPSS version 21 software for analysis where by the proposed model (the eleven hypothesis) were tested using Multiple Linear Regression.

According to Kothari (2004) hypothesis is an assumption made in order to draw out and test its logical or empirical consequences. As such the manner in which research hypotheses are developed is particularly important since they provide the focal point for research. They also affect the manner in which tests must be conducted in the analysis of data and indirectly the quality of data which is required for the analysis. In most types of research, the development of working hypothesis plays an important role. Hypothesis should be very specific and limited to the piece of research in hand because it has to be tested. The role of the hypothesis is to guide the researcher by delimiting the area of research and to keep him on the right track. It sharpens his thinking and focuses attention on the more important facets of the problem. It also indicates the type of data required and the type of methods of data analysis to be used. Hence, a regression model was run to test the eleven hypothesis of the study and investigate the causal relationship of variables where a p-value of < 0.05 was used as a cutoff point to declare statistical significance. Descriptive statistics was used to describe the issues through mean values, percentiles and tables

and that would not be covered using regression result. Cross tabulation was also used to investigate differences thoughts among different respondent groups.

CHAPTER FOUR: RESULTS AND DISCUSSION

3.5. Response rate:

According to the American Association for Public Opinion Research, response rate in survey research is calculated as the number of people who answered the survey divided by the number of people in the sample. Hence, the response rate of the study was found to be 75% (67/89), and of which 11 questioners were discarded for they were incomplete. 63% of questioners from the total targeted population were found complete and treated in the study. This sample was thought enough to proceed with based on the suggestion made by (Cooper & Schindler 2003) and the study sample of size equal to or above 30 is statistically sufficient for generalization.

3.6. Respondents background

According to the demographic details of the main survey (Annex3 table1), 75% of respondents were males implying that logistics in IRC was the male dominant function. This is a bit problematic to logisticians as viewed by Kovacs, Gyongyi & peter (2010) that female beneficiaries are sometimes gender sensitive and may not cooperate to male humanitarian workers in time of disaster. More than 90% of respondents were above 25 years of age and presumably they were matured enough to give genuine responses. The respondents range from assistant to senior managers and such a mix would enable incorporation of wider thoughts pertinent to different work positions. About 97% of respondents have served the organization for more than a year implying that they had a reasonable stay to gauge the logistics performance of the organization and associated factors. All the respondents have completed the higher education and of which 14% were post graduate, 68% were degree holders and 18% were diploma holders implying that they would understand the elements of the questioner and context of the organization so as to answer the questions.

3.7. Reliability assessment

According to Tavakol et al. (2011), Cronbatch's Alpha value ranging from 0.70 to 0.95 is acceptable. As can be depicted in annex3, all the Cronbatch's alpha values of the items were found within the range attesting the good reliability of the instrument.

3.8. Descriptive statistics

Eleven variables which were identified from literatures were considered for the study and of which six were internal factors such as: Recognition of Logistics, Institutional Learning, Adequate Professional Staff, Adequate Use of Information Technology, Sufficient Collaboration and Performance Measurement. The remaining five factors were external situational factors such as: Government Situational Factors, Socioeconomic Situational Factors, Infrastructural Situational Factors, Environment Situational Factors and Availability of Sufficient Donors Fund. Each individual factor has had corresponding items to explain the broad dimension.

3.8.1. Cross tabulation

Annex 2 displayed the cross tab results. Cross tabulation was carried out so as to learn if there are differences in the responses among different respondent groups. Years of work experience and education level were crossed with the variables of the study. For instance, it was realized that among the respondent groups who were categorized under '1-5 years of work experience' (50% the total population) believed that logistics was recognized in IRC Ethiopia at a great extent (mean value=3.73), proportions of donations received for long term preparedness was to a moderate extent (mean value=2.54), available professional logistics staff for humanitarian operations was to a moderate extent (mean value=2.75), use of information technology was to a moderate extent (mean value =2.64), institutional learning was to a moderate extent (mean value =2.68), collaboration with partners was to a moderate extent (mean value=2.68), logistics performance improvement as a result of measuring it was to a great extent (mean value =3.89), suitability of government situational factors was to a moderate extent (mean value =3.29), suitability of infrastructural situational factors was to a moderate extent (mean value=2.83), suitability of socioeconomic situational factors was to a moderate

extent (mean value=3.04), suitability of environmental situational factors was also to a moderate extent (mean value= 2.85) and furthermore, these respondents group believed that the overall logistics performance of humanitarian logistics at IRC Ethiopia was to found to be moderate (mean value=2.88).

From the cross tab result found when education crossed with variables of the study, it was deduced that the majority of respondents (67.9%) were degree holders and they believed that logistics in IRC Ethiopia was recognized at a great extent (mean value=3.59), proportions of donations received for long term preparedness was to a little extent (mean value=2.41), availability of adequate professional humanitarian logistics staff was to a moderate extent (mean value=2.52), use of IT was to a little extent mean (value=2.39), institutional learning was at a moderate extent (mean value=2.61), collaboration with partners was to a moderate extent (mean value=2.51), logistics performance improvement as a result of measuring it was to a great extent (mean value=4.29), suitability of government situational factors was to a great extent (mean value=3.56), suitability of infrastructural situational factors was to a moderate extent (mean value=2.64), suitability of socioeconomic situational factors was to a moderate extent (mean value=2.75), suitability of environmental situational factors was also to a moderate extent (mean value=2.82), and finally same respondent groups believed that the overall performance of humanitarian logistics at IRC Ethiopia was rated to be as a moderate extent.

3.8.2. Recognition of Logistics

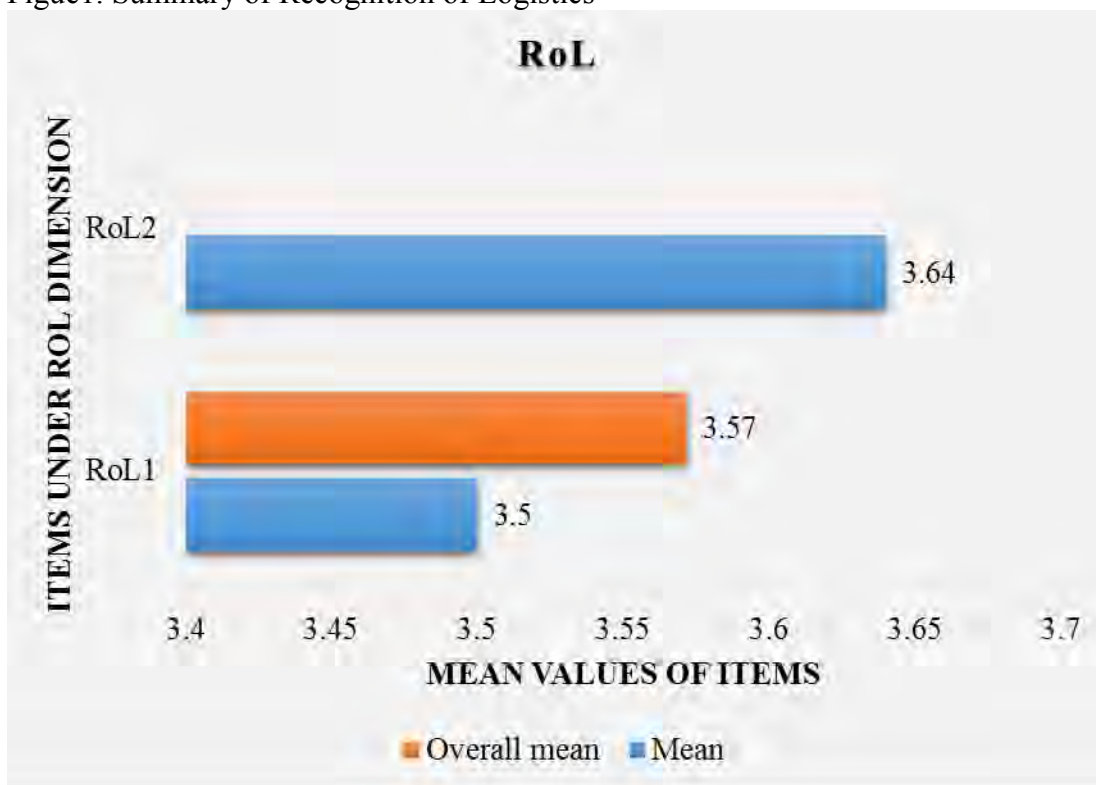
Under Recognition of Logistics dimension there were two specific items in a form of Likert Scale standing for same variable.

Based on the annex3 table2, 21 (37.5%) and 12 (21.4%) of respondents agreed that involvement of logistics staff in organizational decision making process was to a great extent and to a very great extent respectively. Furthermore, 16 (28.6%) and 17 (30.4) respondents responded that involvement of logistics staffs in humanitarian need assessment during startup of emergency & development projects was to a great extent and to a very great extent. On the other hand, 12 (21.4%) of respondents agreed that involvement of logistics in humanitarian needs assessment as well as in organizational decision making process was to a moderate extent. Contrarily, 6(10.7%) and 3 (5.4%) of respondents contended that logistic involvement both in organizational decision

making process and in humanitarian need assessment was to no extent and to a little extent as to 8.9% and 14.3% of respondents.

In summary, fig1 shows almost both items treated under Recognition of logistics (RoL) variable had mean value of 4 (≥ 3.5). Furthermore, the overall mean value of performance of humanitarian logistics was found to be 3.5714 implying Logistics at IRC Ethiopia was recognized at a great extent.

Figure1. Summary of Recognition of Logistics



Source: primary data from survey, 2015.

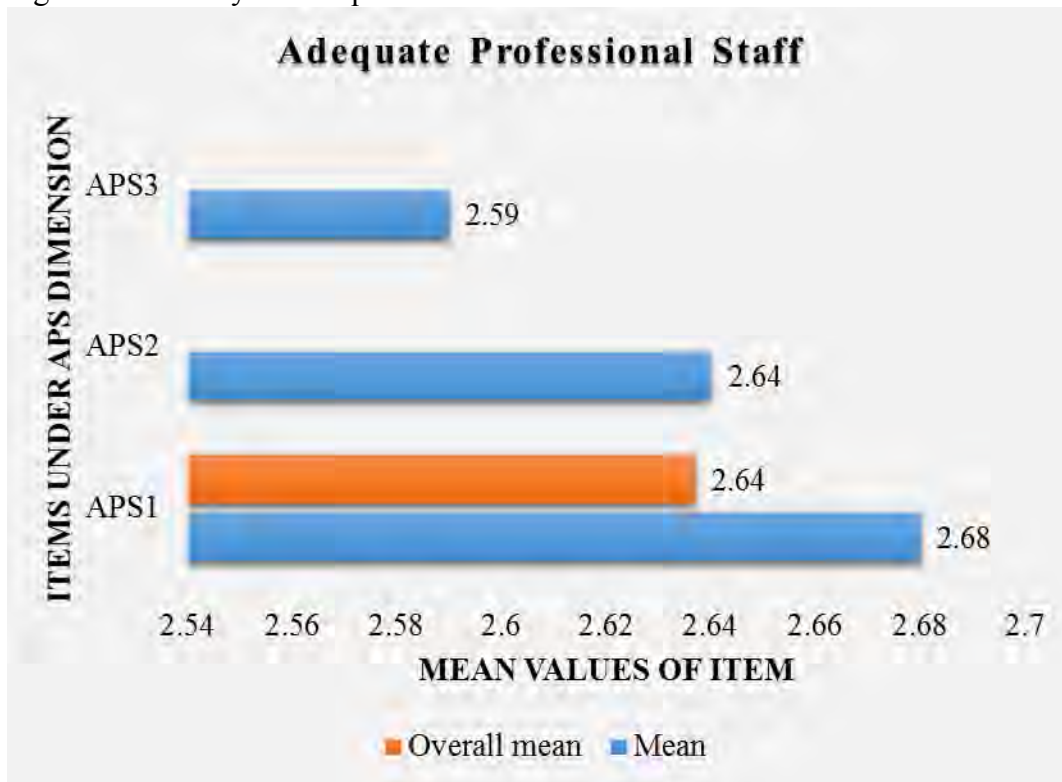
3.8.3. Adequate professional staff

Three specific items entailing around explaining adequate professional staff were presented here.

As can be viewed from annex3 table3, about 12 (21.4%) and 3 (5.4%) respondents believed that coverage of humanitarian logistics courses in local universities or colleges, was to a great and to a very great extent, respectively. Contrarily, 12(21.4%) and 12(21.4%) of respondents answered that coverage of the humanitarian logistics courses was to no and to a little extent, respectively yet only 17(30%) responded that it was to a moderate extent. Pertaining the ‘availability of competent logistics manpower for recruitment from the local community’ about 4(7.1%) and 8(14.3%) of respondents agreed the availability was to a great and to a very great extent, respectively. As opposed to this, 10(17.9%) and 20(35.7%) believed that the availability was to no extent and to a little extent, respectively; however, about 14(25%) respondents contended that it was at its moderate extent. When it came to ‘opportunities to attend advanced field training in humanitarian logistics, only 6 (10.7%) and 7(12.5%) of respondents believed that such opportunities were available to a great and to a very great extent, respectively; about 16(28.6%) and 11(19.6%) believed differently that opportunities were present to no extent and to a little extent, respectively. Apparently, 16(28.6%) viewed that opportunities were present at a moderate extent.

In summary, figure2 presented that all items explaining this variable had mean value of > 2.5 and < 3 . Furthermore, the overall mean value of APS was found to be 2.6369 (≤ 3) denoting that there was moderate number of adequately trained professional logistics staff available for humanitarian operations at IRC Ethiopia during the study period.

Figure2. Summary of Adequate Professional Staff



Source: primary data from main survey, 2015.

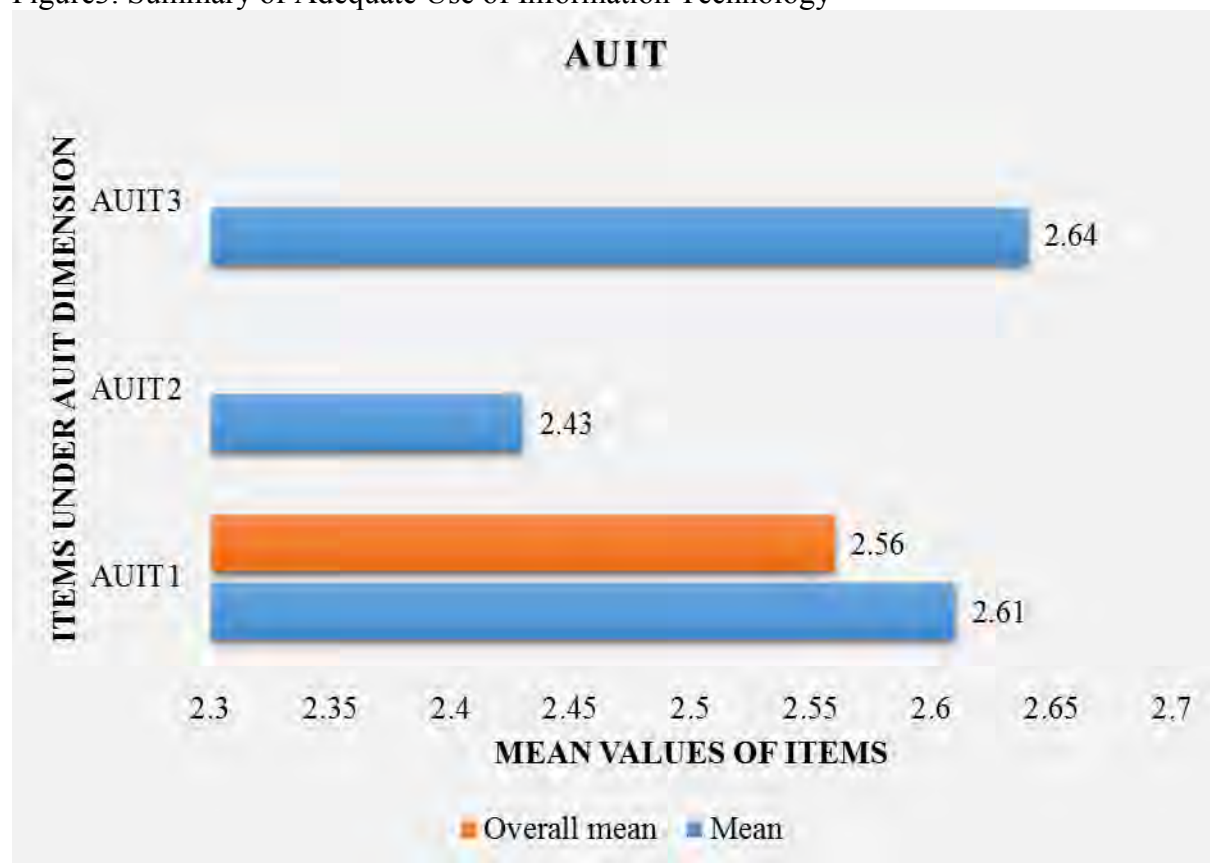
3.8.4. Adequate use of Information technology

Referring to annex3 table 4 below, only 8(14.3%) and 4(7.1%) of respondents believed that their logistics department was able to disseminate accurate and timely information about pipeline inventory to a great extent and to a very great extent, respectively; however, about 10(17.9%) and 18(32.1%) of them contended that dissemination of accurate and timely information was possible to no extent and to a little extent yet it was declared as to a moderate extent by 16(28.6%) of respondents. 'Use of automated systems or mechanisms to increase logistics efficiency' was rated by 11(19.6%) and 1(1.8%) of respondents as to a great extent and to a very great extent, respectively while 13(23.2%) and 19(33.9%) of respondents believed that use of automated systems or mechanisms was to no extent and to a little extent, respectively, and 12(21.4%) of logisticians rated it as to a moderate extent. It's also learnt that only 6(10.7%) and 7(12.5%) of respondents believed that their logistics department has access to necessary logistics

information from data base of other organizations to a great extent and to a very great extent, respectively. Contrarily, 11(19.6%) and 18(32.1%) respondents agreed that access to information was to no extent and to a little extent yet it was at its moderate extent as rated by 14(25%) of respondents.

Furthermore, figure3 summarized that among items treated under this variable two of them had mean value of > 2.5 and < 3 meaning use of IT in terms of disseminating accurate and timely information as well as information sharing from other similar organizations was to a moderate extent. However the mean value of using an automated systems in IRC Ethiopia accounted for 2.43 (< 2.5) meaning the use of IT in this regard was to a little extent. Apparently, the overall mean value of AUIT was found to be 2.5595 (≤ 3) denoting that there was moderate use of IT at IRC Ethiopia during the study period.

Figure3. Summary of Adequate Use of Information Technology



Source: primary data from main survey, 2015.

3.8.5. Institutional learning

Annex3, table5 illustrates that 9(16.1%) and 7(12.5%) of respondents agreed that stability of logistics staff (lack of turnover of logisticians) was to a great extent and to a very great extent, respectively however to no extent as responded by 14 (25%) of respondents and to a little extent as to 12(21.4%) of respondents. Besides, 14 (25%) of respondents believed that logisticians turnover rate was at a moderate extent. Only 9(16.1%) and 3(5.4%) of respondents perceived that Experience sharing through group brainstorming sessions & regular logistics workshops, was to a great and to a very great extent. Opposed to this, 12(21.4%) and 18(32.1%) of respondents responded that experience sharing was to no extent and to a little extent, respectively while it was to a moderate extent as to 14(25%) of respondents. Pertaining ‘formal records of failure or success stories of past logistics experiences’, 14(25% and 1(1.8%) of respondents agreed that success and failure stories were recorded at a great and a very great extent yet to no extent as to 10(17.9%) of respondents and to a little extent as to 17(30.4) respondents. Quarter (25%) of respondents believed that the records were made to a moderate extent.

In summary, figure4 depicted that the mean values of all the three items intended to explain IL as to be > 2.5 and < 3 . In the meantime, the overall mean value of IL was 2.6131 (> 2.5 and ≤ 3) meaning the extent at which institutional learning happening in the IRC Ethiopia was to a moderate extent.

Figure4. Institutional Learning



Source: primary data from main survey, 2015.

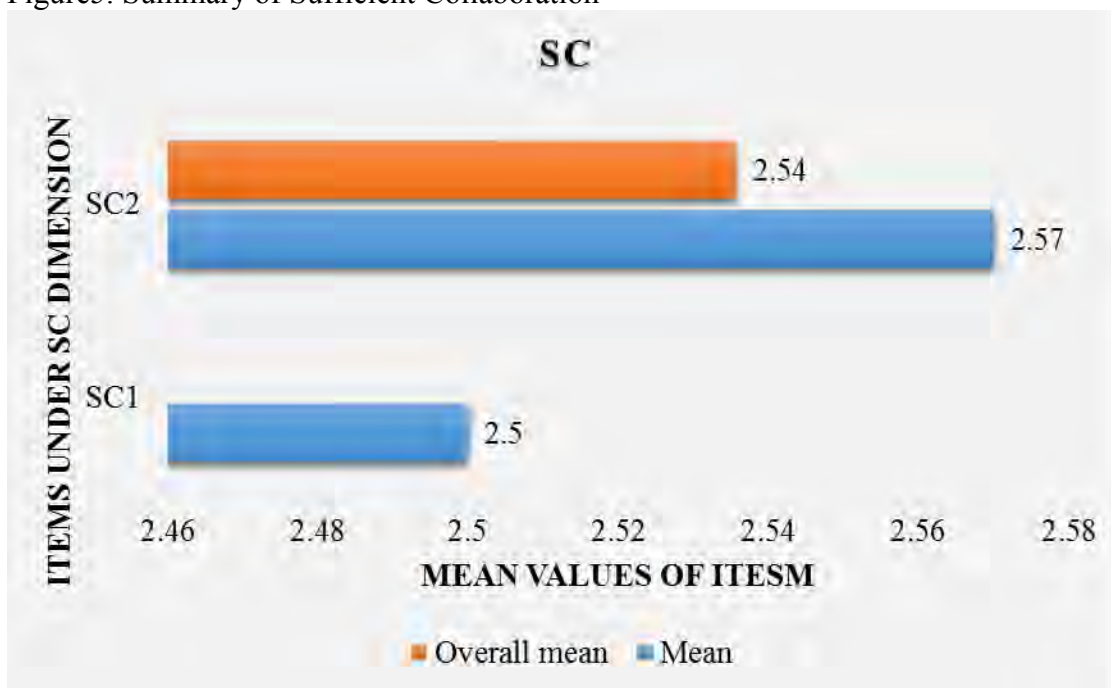
3.8.6. Collaboration

Collaboration was intended to be explained by two items extracted from literatures such as sharing resources and working together with other NGOs. To this end, as can be viewed in annex3, table6, about 9(16.1%) and 5(8.9%) of respondents agreed that their logistics department has shared warehouse and vehicle resources with other partners to a great extent and to a very great extent, respectively; however, 15(26.8%) and 17(30.4%) of respondents perceived that resource sharing was to no extent and to a little extent, respectively yet to a moderate extent as to 10(17.9%) of respondents. When it came to working together for joint logistics planning & implementation, around 7(12.5%) and 6(10.7%) of respondents declared that IRC logistics

department has worked together with other partners to a great extent and to a very great extent, respectively but to a moderate extent as to 15(26.8%) of respondents. Contrarily, 15(26.8%) and 13(23.2%) believed the extent the IRC logistics worked together with other partners was to no extent and to a little extent, respectively.

In summary, figure5 presented that the mean values of ‘resources sharing’ and ‘joint logistics set up & implementation’ were 2.50 and 2.57, respectively and > 2.5 and < 3 meaning IRC Ethiopia shared resource among different partners to a moderate extent and likewise it worked towards joint logistics set up & implementation with other partners to a moderately extent. The overall mean value of collaboration was found to be 2.5357 (≤ 3) implying that the collaboration level IRC Ethiopia has had with other partner organizations was at a moderate extent.

Figure5. Summary of Sufficient Collaboration



Source: primary data from main survey, 2015

3.8.7. Measuring performance of logistics

Respondents were asked the extent of logistics performance improvement as a result of measuring it. As can be referred in annex3, table7, majority of them (42.9% and 35.5%) of respondents agreed measuring logistic performance would improve logistics performance to a great extent and to a very great extent, respectively, but to a moderate extent as to 6(24%) of respondents and to a little extent as to 6(10.7%) of respondents. In general, as can be viewed from table15 the mean value of ‘improvement of logistics performance as a result of measuring it’ was found to be 4.04 implying that IRC Ethiopia’s logistics performance as a result of measuring it was increased by a great extent.

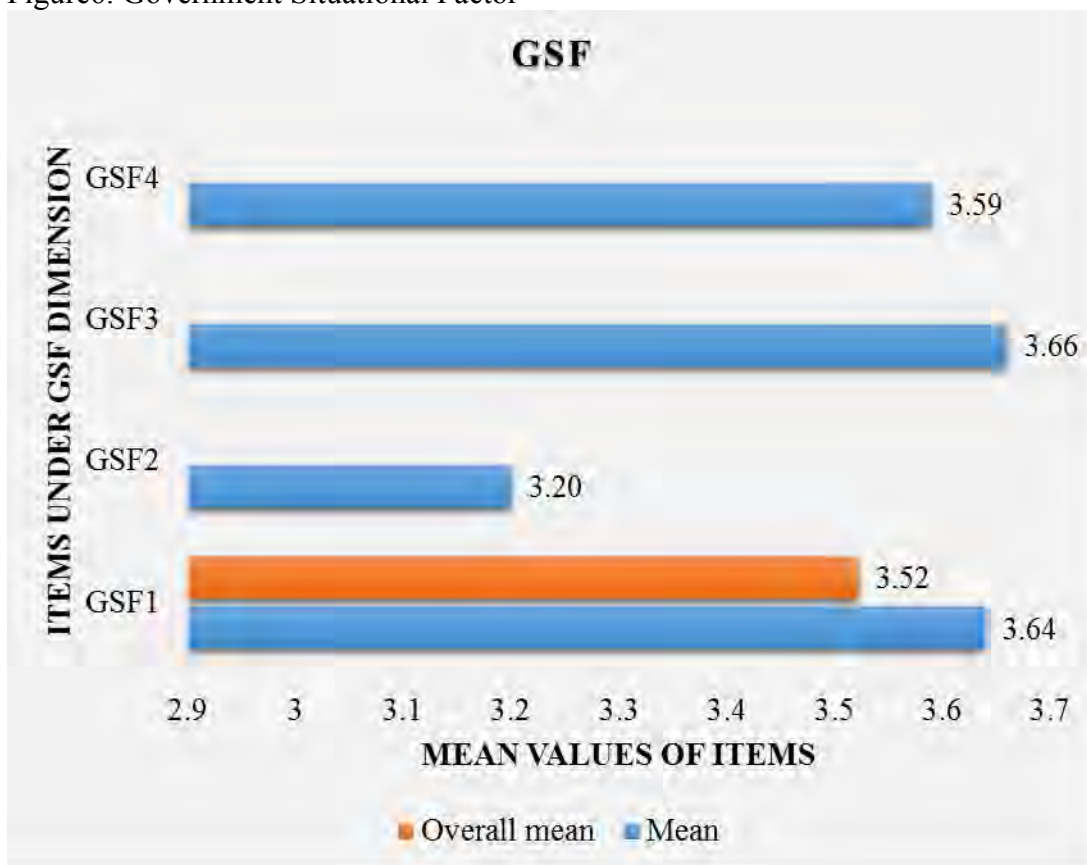
3.8.8. Government situational factor

Four different items were picked from literature and used in explaining government situational factor. As depicted in annex3, table8, about 12(21.4%) and 21(37.5%) of respondents declared that assistance rendered from the government to their logistic operations was to a great and to a very great extent, respectively; however, to a moderate extent as to 12(21.4%) of respondents. In contrary to these, around 7(12.5%) and 4(7.1%) of respondents believed that the assistance rendered by government was to no extent and to a little extent. Regarding ‘Suitability of customs clearing process’, about 19(33.9%) and 10(17.9%) of respondents perceived its suitability was to a great and a very great extent, respectively, but to a moderate extent as to 9(16.1%) of respondents, to no extent as to 10(17.9%) and to a little extent as to 8(14.3%) of respondents. Logisticians were also asked if they feel safe & secured when working in remote areas and about 17(33.9%) and another 17(33.9%) of respondents felt they were safe and secured to a great and to a moderate extent, respectively; however 10(17.9%) of respondents said to a moderate extent yet 2(3.6%) and 10(17.9%) of respondents felt safe and secured to a no extent and to a little extent, respectively. Lastly, logisticians were asked if the local government was flexible enough to allow staff deployment from other localities or Addis Ababa. Accordingly, 13(23.2%) and 18(32.1%) of respondents agreed that flexibility of local government was to a great and to a very great extent, respectively however to a moderate extent as to 13(23.2%) of respondents. As

opposed to these, about 4(7.1%) and 8(14.3%) of respondents believed that flexibility of local governments was a no extent and to a little extent, respectively.

Figure6 summarized that among four items considered under Government Situational Factor (GSF) dimension, three of them have the mean values >3.5 and ≤ 4 implying that IRC Ethiopia logisticians believed that assistance received from the government as well as flexibility of local governments was to a great extent. Similarly the extent they felt safe & secured when working in remote areas was also to a great extent. Apparently, the mean value of suitability of customs clearing process for logistics performance (3.20) was found to be at a moderate extent.

Figure6. Government Situational Factor



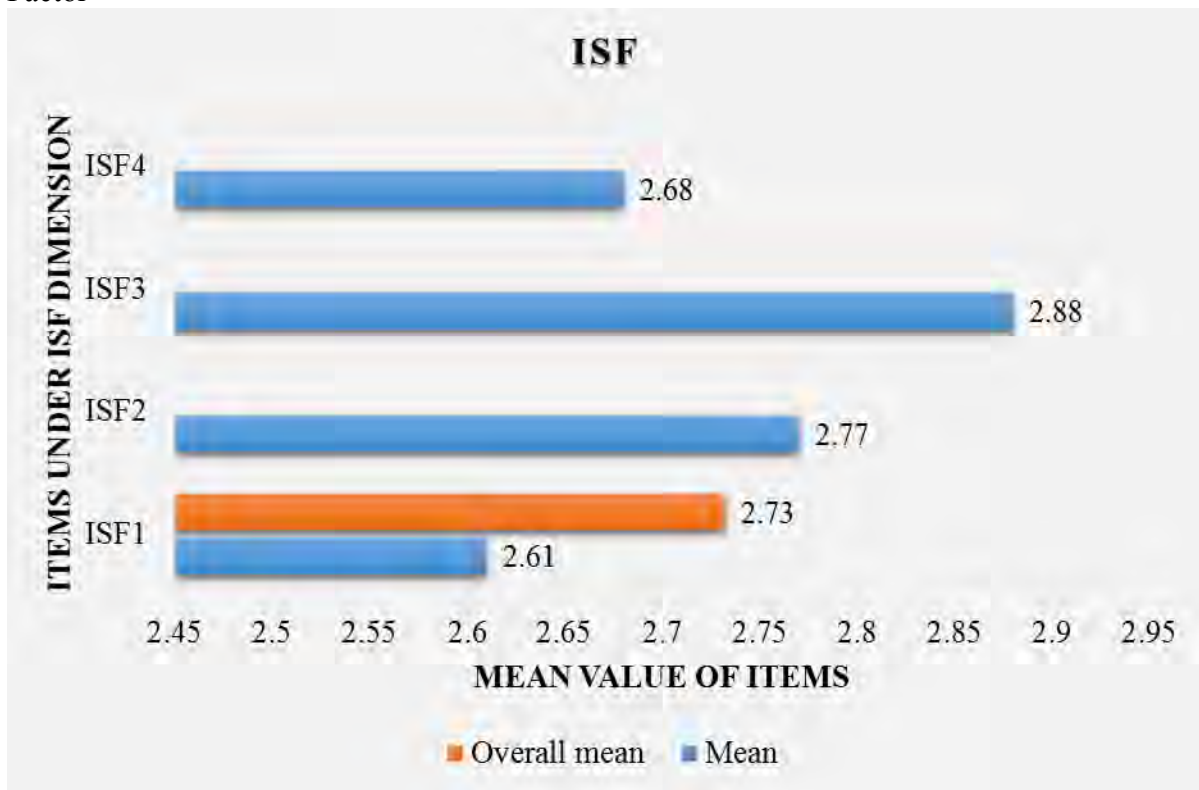
Source: primary data from main survey, 2015.

3.8.9. Infrastructural situational factor

Annex3, table9 illustrates four items adapted from literatures (Kunz & Reiner 2012; Wassenhove 2006; Bayusuf 2010) towards an attempt to explain infrastructural situational factor. About 11(19.6%) and 5(8.9%) of respondents believed that all-weather alternative roads were available to a great extent and to a very great extent. Around 15(26.8%) and 13(23.2%) of respondents thought differently that all-weather roads were available to no extent and to a little extent, respectively yet to a moderate extent as to 12(21.4) of respondents. Adequacy or stability of electric utilities was perceived by 14(25%) and 3(4.5%) of respondents as a great extent and a very great extent, respectively; however, to a moderate extent as to 16(28.6%) of respondents, to no extent as to 10(17.9%) of respondents and to a little extent as to 13(23.2%) of respondents. According to 13(23.2%) and 7(12.5%) of respondents, water utilities were available or stable to a great extent and very great extent, respectively, but to a moderate extent as to 12(21.4%) of respondents, to no extent as to 10(17.9%) of respondents and to a little extent as to 14(25%) of respondents. Adequacy or stability of communication utilities were rated as a great extent and very great extent by 11(19.6%) respondents and 4(7.1%) respondents, respectively. Differently to this, 15(26.8%) of respondents believed that communication utilities were stable to a moderate extent; to no extent as to 10(17.9%) of respondents and to a little extent as to 14(25%) of respondents.

In summary, figure7 displayed the mean values of items considered under ISF (Infrastructural Situational Factor) dimension. Accordingly, the mean values of all the items were found as >2.5 and ≤ 3 implying that adequacy or stability of utilities such as: electricity, water & communication as well as availability of all-weather alternative roads were to a moderately extent and likewise, the overall mean value (2.7321) of ISF indicated that, in general, suitability of infrastructural situational factors was to a moderate extent.

Figure7. Infrastructural Situational
Factor



Source: primary data from main survey, 2015.

3.8.10. Socioeconomic situational factor

Six items representing this factor were extracted from literatures (Altay et al. 2009; Dowty & Wallace 2010; Kandiyoti 2007; Leon et al. 2009; Maon et al. 2009). According to annex3, table10, about 15(26.8%) and 5(8.9%) of respondents agreed that beneficiaries demand was stable to a great and very great extent, respectively, but to a moderate extent as to 12(21.4%) of respondents, to no extent as to 13(23.2%) of respondents and to a little extent as to 11(19.6%) of respondents. About 8(14.3%) and 9(16.1%) of respondents believed that local suppliers understanding level was to a great extent and very great extent, respectively; to a moderate extent as to 17(30.4%) of respondents, to no extent as to 8(14.3%) of respondents and to a little extent as to 14(25%) of respondents. With regard to suppliers flexibility, around 13(23.2%) and 2(3.6%) of respondents said that suppliers were flexible to a great and very great extent, but the

majority (39.3%) of respondents agreed that suppliers were flexible to a moderate extent, 10(17.9%) of respondents said to no extent and the remaining respondents 9(16.1%) believed the flexibility level was to a little extent. Pertaining price stability of demand, majority (30.4%) of respondents agreed that price was stable to a moderate extent. Contrarily, around 12(21.4%) and 7(12.5%) of respondents believed that price was stable to a great extent and very great extent, respectively; to no extent as to 5(8.9%) of respondents and to a little extent as to 15(26.8%) of respondents. When it came to capacity of local market to replenish humanitarian goods and services, the majority (37.5%) of respondents agreed that local market was moderately able to replenish the needs. However, 17.9% of respondents and 10.7% of respondents said that capacity of local markets to meet the humanitarian needs was to a great and very great extent and as opposed to this 5.4% of respondents and 28.6% of respondents believed that capacity of local markets was to no extent and to a little extent, respectively. With regard to effect of gender preference of beneficiaries, about 17.9% and 12.5% of respondents believed that beneficiaries have accepted the service to a great and very great extent, respectively despite the gender difference of the logisticians. In contrarily, 17.9% and 28.6% respondents believed that the beneficiaries were gender sensitive and hence the extent of accepting the service from either of the gender was to a no extent and to a little extent, respectively.

In addition, figure8 summarized that almost all items under SSF dimension as well as the overall mean of Socioeconomic situational factor (SSF) have the mean values between 2.5 and 3 implying suitability of socioeconomic factors for humanitarian logistics operation was at a moderate extent.

Figure8. Summary of Socioeconomic Situational factor



Source: primary data from main survey, 2015.

3.8.11. Environmental situational factor

Three items from Kunz & Reiner (2012) were extracted and situated towards presenting environmental situational factor. As can be viewed from annex3, table11, the majority (42.9%) of respondents believed that favorability of storage areas to goods stored in the warehouse was to a moderate extent and 17.9% of respondents agreed that favorability of storage areas was to a great extent. On the other hand 7.1% and 32.1% of respondents contended that favorability of storage areas was to a no extent and to a little extent, respectively. With regard to Suitability of work environment, 21.4% and 5.4% of respondents agreed that work environment was suitable for Physical & mental

wellbeing of logisticians to a great and very great extent, respectively; however, about 8.9% and 25% of respondents contended that suitability of work environment was to no extent and to a little extent, respectively yet majority (39.3%) of respondents believed suitability was to a moderate extent. Coming to effect of rainy seasons on moving goods and manpower, 19.6% of respondents agreed that despite the rainy season their logistics department was capable of transporting goods and manpower to a great extent. Contrarily, 5.4% and 30.4% of respondents agreed that as a result of rainy season capability of transportation was limited to no extent and to a little extent. On the other hand the majority (44.6%) of respondents said that the capability of transporting goods and manpower was at a moderate extent.

In summary, figure9 depicted that the mean values of all items under ESF dimension as well as the overall mean of ESF itself were found to >2.5 and ≤ 3 implying that suitability of environmental situational factors to the performance of IRC Ethiopia logistics was to a moderate extent.

Figure9. Summary of Environmental Situational



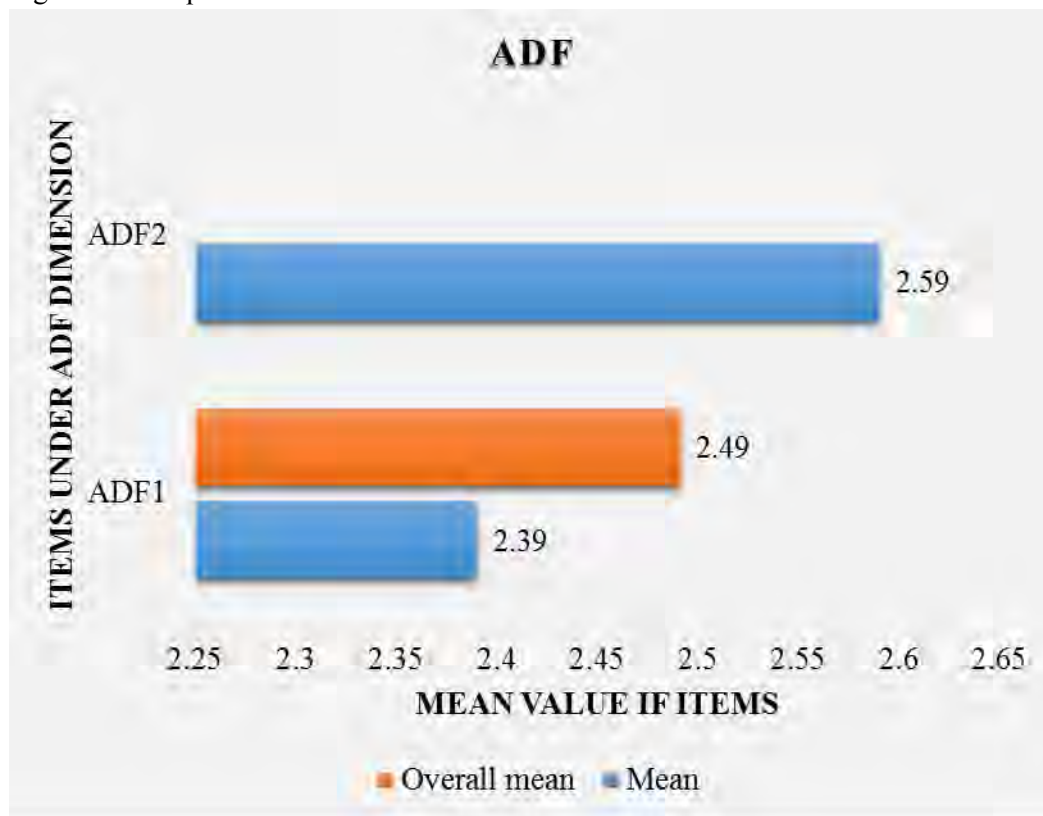
Source: primary data from main survey, 2015.

3.8.12. Adequate donors' funding

Two items which were emphasized by Maon, Lindgreen & Vanhamme (2009), Wassenhove (2006) and Thomas & Kopczak (2005), were used towards explaining donors funding. According to annex3, table12, about 21.4% of respondents believed that sufficiency of donors funding for logistics infrastructure & capabilities was to a great extent. Nonetheless, 26.8% and 28.6% of respondents agreed that sufficiency of donor funding for long term logistics infrastructure and capabilities was to no extent and to a little extent, respectively yet 23.2% of respondents contended that it was stuffiest to a moderate extent. With regard to sufficiency of donors funding for long term disaster preparedness, 12.5% of respondents believed that findings were sufficient to a great and to a very great extent. Nevertheless, 23.2% and 32.1% of respondents believed that findings for long term disaster preparedness were to no extent and to a little extent, respectively, yet to a moderate extent as to 19.6% of respondents.

According to figure10, the mean value of donors funding for logistics infrastructure & capabilities was found to be 2.39 (≤ 2.5) showing that there was a little money spent on logistics infrastructure & capabilities. Contrarily, mean value of donors funding for long term disaster preparedness was 2.59 (≤ 3) implying that moderate amount money was spent by IRC for long term disaster preposition during the study period. Besides, the overall mean value of Adequate Donors Fund was found to be 2.4911 (≤ 3) indicating the amount of donors funding granted to IRC Ethiopia specific to long term logistics capabilities and disaster preposition was not sufficient or just to a little extent.

Figure10. Adequate Donors Fund



Source: primary data from main survey, 2015.

3.8.13. Performance of humanitarian logistics

In order to measure performance of humanitarian logistics seven relevant items were picked from literature. Beamon & Balcik (2008) suggested that relief aid performance measurement system should incorporate metrics from three dimensions namely: resource metrics, output metrics and flexibility metrics. These were further tuned up during pilot test of questioner and the organization's performance measurement system was considered while setting up this measurement system of the study. Accordingly, the first two metrics were from resource metrics, the next two from output metrics and the last three from flexibility metrics. With reference to annex3, table13, about 8.9% and 26.8% of respondents believed that inventory utilization with in grant life time and before expiry dates was to a great and to a very great extent, respectively. However, 17.9% and 23.2% of respondent agreed that inventory utilization was to no extent and

to a little extent, respectively yet 23.2% of respondents contended that inventory utilization in this regard was to a moderate extent. About 21.4% and 8.9% of respondents believed that Spending of money as per the budget or procurement plan was to a great and to a very great extent, respectively. However, 16.1% and 28.6% of respondents agreed that money spending ability as per the plan was to no extent and to little extent, respectively yet 25% of respondents contended that money spending as per the plan was to a moderate extent.

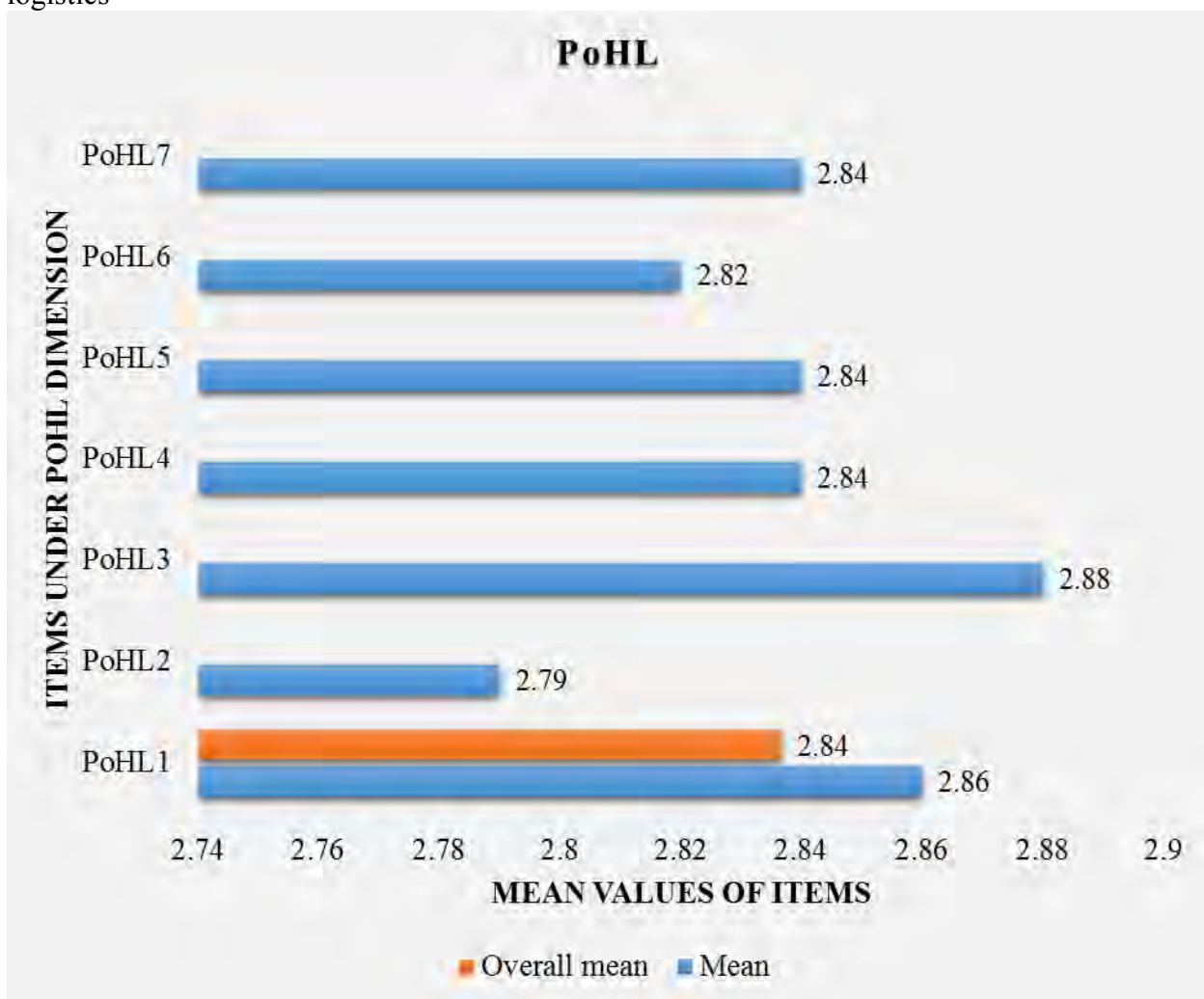
With regard to Purchasing of goods & services as per beneficiaries demand, 16.1% and 14.3% of respondents agreed that goods & services purchased as per beneficiaries demand to a great and very great extent, respectively; however, about 16.1% and 25% of respondents contended that suitability of work environment Purchasing of goods & services as per beneficiaries demand was to no extent and to a little extent, respectively but it was to a moderate extent as to the majority (28.6%) of the respondents. Coming to Dispensing of aids to all needy beneficiaries, 23.2% and 7.1% of respondents agreed that the logistics department was able dispense aid to all beneficiaries to a great extent and very great extent, respectively. Contrarily, 12.5% and 28.6% of respondents agreed that dispensing aid to all beneficiaries was limited to no extent and to a little extent. On the other hand 28.6% of respondents said that dispensing of aids to all needy beneficiaries was to a moderate extent.

Regarding 'Consistent response to unplanned requests for goods & services within planned lead-time or less', about 23.2% and 5.4% of respondents perceived that consistency was to a great and a very great extent, respectively, but to a moderate extent as to 28.6% of respondents, to no extent as to 7.1% of respondents and to a little extent as to 35.7% of respondents. Logisticians were also asked if their logistics department was Consistent in delivery of any given quantity or volume of commodity and about 17.9% and 10.7% of respondents perceived that flexibility in this regard was to a great and to very great extent, respectively; however 26.8% of respondents said to a moderate extent yet 12.5% and 32.5% of respondents said to a no extent and to a little extent, respectively. Lastly, respondents were asked if their logistics department was able to consistently deliver all list of assorted items to be situated in emergency and dignity kits. Accordingly, about 21.4% and 10.7% of respondents perceived that consistency in this regard was to a great and to very great extent, respectively; however 30.4% of respondents said to a

moderate extent yet 21.4% and 16.1% of respondents said to a no extent and to a little extent, respectively.

As can be viewed from figure11, almost all items treated under PoHL variable had mean value of 3 (≥ 2.5). Furthermore, the overall mean value of performance of humanitarian logistics was found to be 2.8367 implying the performance of humanitarian logistics of IRC Ethiopia during the study period was found to be at its moderate extent

Figure11. Summary of Performance of Humanitarian logistics



Source: primary data from main survey, 2015.

3.9. MULTIPLE REGRESSION

Multiple Regressions has been one of best statistical tools and frequently used to explain multiple relationships of variables as well as to achieve best prediction of set of variables (Robert 2006). Among different regression models, this study used Multiple Linear Regression to identify the unique contribution of each independent variables of the study.

3.9.1. Testing assumption of multiple regression

3.9.1.1. Normality

Robert (2006) defined normality as the shape of normal distribution of the metric variable and according to Tobachinck and Fidell (2006) it can be measured through statistical tests of Skewness and kurtosis where Skewness measures the symmetry of distribution and Kurtosis measures the peakness of distribution. Moreover, Hair (2010) further underlined the benchmark against which Skewness and Kurtosis values to be checked, and according to this author, any given value of these tests is equal to zero means that the variables are normally distributed and any value other zero implies deviation from normality and yet any value found within the range of ± 2.58 is still acceptable. Henceforth, in order to determine whether variables treated under this study were normality distributed, their values of Skewness and Kurtosis were tested and found to be with in the acceptable range as can be viewed under Annex4.

3.9.1.2. Multicollinearity assumptions

According to Everitt (2004) and Robert (2006), Multicollinearity is a situation in which the independent/explanatory variables are highly correlated. An ideal approach of measuring the multicollinearity is through examination of the variance inflation factors (VIFs) or the tolerances of the explanatory variables. The tolerance of an explanatory variable is defined as the proportion of variance of the variable in question not explained by a regression on the remaining explanatory variables with smaller values indicating stronger relationships. The VIF of an explanatory variable measures the inflation of the variance of the variable's regression coefficient relative to a regression where all the explanatory variables are independent. The VIFs are inversely related to the tolerances with larger values indicating involvement in more severe relationships (according to a rule of thumb, VIFs above 10 or tolerances below 0.1 are seen as a cause of concern). In view of this, Multicollinearity test was carried out to all variables of the

study and as can be depicted under Annex4, Multicollinearity assumptions pertinent to variables studied in the model was satisfied.

3.9.2. Multiple regression analysis result

Regression is a statistical tool that allows us to predict the value of one continuous variable against one or more other variables. When performing a regression analysis each independent variable is associated with specific coefficients in the equation that summarizes the relationship between that independent variable and the dependent variable. Once we estimate a set of coefficients in a regression equation, we can use hypothesis tests and confidence intervals to make inferences about the corresponding parameters in the population. We can also use the regression equation to predict the value of the dependent variable given a specified set of values for our independent variables (Coster 2004).

In this study, simple linear regression is used to predict the value of a single continuous direct variable (Y) from a single continuous independent variable (X). Regression assumes that the relationship between independent variable and the dependent variable can be represented by the equation:

$$Y=A+B_1X_1+B_2X_2+.B_nX_n+ \epsilon$$

Where:

Y= the predicted/dependent variable

A= constant

B= unstandardized regression coefficient

X= value of the predicted coefficient

ϵ = is the error term

Thus, in this study the following multiple equations were used to predict the level of performance of humanitarian logistics from the eleven independent variables.

$$PoHL=A-B_1R+B_2F+B_3S+B_4T+B_5L+ B_6C+ B_7P+ B_8G+B_9I+ B_{10}SS+ B_{11}E+ \epsilon$$

Where:

R= Recognition of Logistics (RoL)

F= Adequate Donors Fund (ADF)

S= Adequate Professional Staff (APS)

T=Adequate Use of Information Technology (AUIT)

L=Institutional Learning (IL)

C=Sufficient Collaboration (SC)

M= Measuring Performance (MP)

G= Government Situational Factor (GSF)

I= Infrastructural Situational Factor (ISF)

SS= Socioeconomic Situational Factors (SESF)

E= Environmental Situational Factor (ESF)

Substituting regression coefficients from (table 14 below) the regression equation for the study is presented as follows:

$$\text{PoHL} = -0.247 - 0.009R + 0.191F + 0.179S + 0.072T + 0.112L + 0.031C \\ + M0.014 + 0.083G + I0.14 + 0.123SS + 0.188E$$

Table14. Summary of Regression coefficients of determination

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.247	.318		-.778	.441
	RoL	-.009	.033	-.012	-.282	.779
	ADF	.191	.049	.228	3.874	.000
	APS	.179	.052	.228	3.473	.001
	AUIT	.072	.050	.085	1.457	.152
	IL	.112	.053	.132	2.125	.039
	SC	.031	.031	.041	1.003	.321
	MP	.014	.037	.014	.365	.717
	GSF	.083	.037	.090	2.265	.028
	ISF	.140	.048	.170	2.900	.006
	SESF	.123	.042	.132	2.932	.005
	ESF	.188	.071	.151	2.662	.011

Source: primary data from main survey, 2015.

As can be viewed from table 15 below, The study model has had an adjusted R^2 value of 0.936 meaning about 94% of the total variability in the dependent variable is explained by the model of the study (Recognition of Logistics, Adequate Donors Fund, Adequate Professional Staff, Adequate Use of Information Technology, Institutional Learning, Sufficient Collaboration, Measuring Performance of Logistics, Government Situational Factor, Infrastructural Situational Factor, Socioeconomic Situational Factor and Environmental Situational factor).

The remaining 6% of variability in Performance of Humanitarian Logistics is explained by other factors not considered in the study.

Table 15. Summary of Regression model of performance of Humanitarian Logistics

R	R Square	Adjusted R Square	F Change	Sig. F Change
0.974	0.949	.936	74.185	0.000

Source: primary data from main survey, 2015.

Table 16. Summary of ANOVA Table for Performance of Humanitarian Logistics

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.656	11	3.878	74.185	.000
	Residual	2.300	44	.052		
	Total	44.956	55			

Source: primary data from main survey, 2015.

To test hypothesis of no linear relationship ($R^2=0$) between the explanatory/predictor and dependent/predicted variable, the analysis of variance (ANOVA) test is used (Landau Everitt, 2004; Robert 2006). Table 16 above presented the results of F statistics test to show how well the regression model fits the data. If the value of F statistics is big and the significance level is less than 0.05 then the hypothesis of no linear relationship between the predictor variable and predicted variable is rejected. Henceforth, the probability of the F statistic of this study (74.185) for the overall regression relationship was =0.000 which is less than the level of significance (0.05). And hence, it can be deduced that the regression model fits the data. In other words there is a statistically linear relationship between the set of independent variables (Recognition of logistics, Adequate Donors Fund, Adequate Professional Staff, Adequate Use of Information Technology, Institutional Learning, Sufficient Collaboration, Measuring Performance of Logistics, Government Situational Factor, Infrastructural Situational Factor, Socioeconomic Situational Factor and Environmental Situational factor) and the dependent variable (performance of humanitarian logistics).

3.9.2.1. Association of individual independent variables with dependent variable

Table16 presents the coefficient of the independent variables considered in the model of the study. At 95% confidence interval, variable found statistically significant on the t-statistics test are discussed below.

Donors' funds:

According to the research finding, donors funding was found to be the most important factor associated with the performance of humanitarian logistics. Holding other factors constant, a unit change in donors' funds for logistics infrastructures & capabilities as well as for long term disaster preparedness leads to an increase in performance of humanitarian logistics by 0.191 units satisfying H11. Apparently, the mean value of 2.4911, indicated that the allocated funds are slightly higher than a little extent and by far lower than a moderate extent. Perhaps, this is due to the fact that humanitarian organizations that spend the least on overhead are often considered the most efficient and hence they hesitate to spend money on complex systems (Long, 1997). However, so long as humanitarian organizations want to improve their logistics performance, it is imperative for them to invest adequate funds on logistics systems and long term disaster preposition (Thomas & Kopczak 2005; Wassenhove 2006; Maon, Lindgreen & Vanhamme 2009).

Whiting & Ostrom (2009) and Thomas (2003) observed that donors are not investing money for preparedness which prevents humanitarian organizations from developing processes and systems to improve relief efficiency and effectiveness.

Environmental situational factor:

Next to donors funding, environmental situational factors were strongly associated with performance of humanitarian logistics. Holding other factors constant, a unit increase in favorability of work environment for stored inventory and for the wellbeing of physical & mental of logisticians (together with convenience of rainy seasons for transportation of goods and personnel) will cause an increase in performance of humanitarian logistics by 0.188 units; H10 is satisfied.

However, favorability of environmental situational factors available in the places where IRC Ethiopia works were found below a moderate extent (mean value=2.7976). Previous researches have also suggested that the effects of climate change worsen the impact of disaster and as a result the logistical challenges are always complex and overwhelming. And hence, the conditions under which humanitarian logisticians must work are extremely chaotic and stressful. (Fritz institute 2003; Chandes & Pache 2009; International Federation of Red Cross 2008).

Adequate Professional staff:

The third important factor associated with performance of humanitarian logistics was availability of adequate professional staff. For a unit increase in availability of adequate professional staff, the performance of humanitarian logistics will increase by 0.179 units holding other factors constant thereby H2 is satisfied. In other words, the research finding indicated that there are lack of coverage of specific humanitarian logistics courses in local universities and colleges in Ethiopia, and there are no adequate opportunities presented by the organization for advanced field trainings in humanitarian logistics. Moreover, it was learnt that there are no sufficient professional logistics manpower for requirement from the local community. The previous study of Tatham, Kovacs & Larson (2010) supported this finding that the skills the current humanitarian logisticians possessed are too much of administrative and functional. Henceforth, a number of additional skills on top of the T-shaped model of commercial logistics skills are required. These are the skills logisticians would need to develop before entering the humanitarian field. Unfortunately, the logisticians come from diverse and varied backgrounds and acquired their humanitarian skill through trial and error (Thomas & Kopczak 2005).

Infrastructural situational factor:

It's the 4th significant factor and a unit increase in suitability of roads infrastructure and consistent and reliable utilities of water, electricity and communication, will increase the performance of humanitarian logistics by 0.140 units (holding other factors constant), where H8 is satisfied. Furthermore, the mean value (2.7321) of infrastructural situational factors indicated that suitability of these factors where IRC Ethiopia works was found below the moderate extent. Previous study conducted by Wassenhove (2006) also supported that humanitarian logistics operates in such areas where roads are often inadequate, with fragmented technology and poorly defined manual processes.

Socioeconomic factor:

Holding other factors constant, a unit increase in socioeconomic factors (acceptance of humanitarian services despite gender differences, stability of beneficiaries' demand, price stability of humanitarian needs, literacy and flexibility level of suppliers and availability of required goods & service in local market), will cause an increase in performance of humanitarian logistics by 0.123 units, and hence H9 is satisfied. In other words, the lower mean value (2.8839) of socioeconomic situational factors showed that favorability of these factors was lower than a moderate extent. This is much more prevalent in developing countries (Altay et al. 2009; Kunz and Reiner 2012; Choi, Beresford, Pettit & Bayusuf 2010) that illiteracy of community and fragile operating conditions hindered performance in logistics.

Institutional learning

The performance of humanitarian logistics will increase by 0.112 units for a unit increase in institutional learning (holding other factors constant), satisfying H4. This result was in line with the findings of Thomas & Kopczak (2005) that reduced turnover of logistics staff and records making and utilization of logistics data for post-event learning will increase efficiency and effectiveness of logistics in other humanitarian operations. However, the mean value of stability of logistics staff, experience sharing and recording of failure and success stories (2.6131) implied that the extent of institutional learning at IRC is higher than a little extent and lower than a moderate extent.

Government situational factors:

For a unit increase in government situational factors, the performance of humanitarian logistics will increase by 0.083 units, holding other factors constant satisfying H7. Previous studies also underlined that government factors have positive effect on performance of logistics. For instance, adequate assistance from the government, fast customs clearing process, safety & security and flexibility of local governments will increase performance of humanitarian logistics (Kunz & Reiner 2012; Long & Wood 1995; Tomasini & Wassenhove 2004). The finding of this study showed that suitability of government factors where IRC works was above moderate extent and below to a great extent as referenced from 3 as a moderate extent under Likert scale.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1. CONCLUSION

Previous studies provided useful findings and suggestions for further research. Some suggested case studies and survey methodologies be used to validate findings of their research with regard to external factors. Others have published internal factors challenging humanitarian logistics, but none of them have grouped internal & external factors together and showed the extent of each of these factors. However, this study is the first attempt to examine the significance level of each of eleven variables associated with performance of humanitarian logistics. Moreover, so far, these variables were not investigated in the IRC Ethiopia context and hence this study is the first and the original in the case of this organization.

As per the research finding, out of the eleven independent variables seven were found statistically significant on the t-statistics test. Descending from highest to lowest per their significance level factors are listed as: donors' funds, environmental situational factors, professional staff, infrastructure situational factors, socioeconomic situational factors, Institutional learning and government situational factors.

Though statistically insignificant, the remaining independent variables have positive relationship with dependent variable except the "Recognition of logistics" which has the negative Beta value.

Taking 3 as a reference point as a moderate extent in five point Likert scales, it was also found that:

- Logistics at IRC Ethiopia was recognized at a great extent.
- There was a moderate number of professional logistics staff available for humanitarian operations at IRC Ethiopia

- There was moderate use of IT at IRC Ethiopia during the study period;
- Institutional learning happening in the IRC Ethiopia was to a moderate extent;
- The collaboration level IRC Ethiopia has had with other partner organizations was at a moderate extent;
- The performance of humanitarian logistics of IRC Ethiopia during the study period was found to be at its moderate extent;
- Suitability of government factor was found to be at a moderate extent;
- Suitability of infrastructural situational factors was to a moderate extent;
- Suitability of socioeconomic factors for humanitarian logistics operation was at a moderate extent;
- Suitability of environmental situational factors to the performance of IRC Ethiopia logistics was to a moderate extent;
- Donors Fund specific to long term logistics capabilities and disaster preposition was not sufficient or just to a little extent;

5.2. RECOMMENDATION

Donors funding

- Donors to consider investing necessary funds towards preparedness
- IRC Ethiopia to consider allocating sufficient funds on logistics and long term preparedness.

Environmental situational factors

IRC to prepare for no disruption of commodity transportation during rainy seasons. This may happen through pre-positioning of heavy duty power trucks equipped with 4WD and differential lock system, or otherwise plan for liaising with WFP for utilization of its air cargos. Or consider transportation of cargo in dry seasons.

Professional staff

The local universities and colleges to incorporate humanitarian logistics courses in their curriculum and ensure their future logisticians developed the required five skill sets as early as at schools. The five skill set frame work in a nut shell is presented as: general management skills, functional logistics skills, problem solving skills, interpersonal skills and additional skills (such as reporting, emergency preparedness, Design and Implementation of policies, procedures and standards, security management, mechanics and maintenance, working under Pressure in a harsh environment and knowledge of donors regulations).

IRC Ethiopia to think through increasing facilitation of standard and advanced field training to its logisticians. This could be done through either coordination or collaboration with similar organizations and or with international institutions such as Fritz institute which can give advanced field training in humanitarian logistics.

IRC Ethiopia to consider allocating its logisticians as a secondees in a very harsh and complex environment to enable them develop the required special skills for the purpose.

Infrastructural situational factors

Government to consider increasing construction of alternative roads to various regions of the country as well as increase reliability of utilities.

Given the intermittent utilities across the country, IRC to consider continue in investing on backups for water, electricity and communications.

Socioeconomic situational factors:

IRC to consider changing view of its suppliers from transactional to collaborative one so that they will feel they are part of the IRC family. This may happen through:

- Strategic partnership at least with main suppliers by establishing long term frame work of agreement.
- Inviting suppliers in major IRC occasions or project close out events, this will give them opportunities to realize their contribution to the humanitarian works and hence feel they are part of that success.
- IRC to consider capacity building training to its suppliers.

Government to ponder establishing a mechanism to stabilize cost of humanitarian goods and services.

Government situational factor

IRC to think over:

- Getting a permit from customs authorities for inspection of imported materials at its own ware house.
- Increasing partnership with the government both at regional and federal level.

Institutional learning

IRC to think about retention of logistics staff, increase logistics experience sharing and reflection workshops as well as records of failure or success stories of past logistics experiences in order to learn and improve on next humanitarian interventions.

5.3. FUTURE DIRECTION

Being an organization based cross sectional case study, this research has suffered generalizability problem to International non-governmental humanitarian organizations in Ethiopia. The research has also failed to support some of its hypothesis: H1, H3, H5 and H6. Longitudinal and survey methodology incorporating all INGOs in Ethiopia is recommended to validate the findings of this research in a wider context.

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ANNEX1. RELIABILITY STATISTICS

RECOGNITION OF LOGISTICS (RoL)

/VARIABLES=RoL1 RoL2

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA.

Reliability Statistics:

Cronbach's Alpha	N of Items
.889	2

Case Processing Summary

	N	%
Valid Cases	56	100.0
Excluded ^a	0	.0
Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Involvement of logistics staffs in organizational decision making process.	3.64	1.470	.801	.
Involvement of logistics staffs in humanitarian need assessment during startup of emergency & development projects.	3.50	1.527	.801	.

ADEQUATE DONORS FUND (ADF)

/VARIABLES=ADF1 ADF2

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA.

Reliability Statistics

Cronbach's	N	of
Alpha	Items	
.732	2	

Case Processing Summary

		N	%
Cases	Valid	56	100.0
	Excluded ^a	0	.0
	Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Sufficiency of donors funding for logistics infrastructure & capabilities.	2.59	1.737	.586	.
Sufficiency of donors funding for long term disaster preparedness.	2.39	1.225	.586	.

ADEQUATE PROFESSIONAL STAFF (APS)

/VARIABLES=APS1 APS2 APS3

/SCALE ('ALL VARIABLES') ALL

/MODEL=ALPHA.

Reliability Statistics

Cronbach's Alpha	N of Items
.889	3

Case Processing Summary

	N	%
Valid Cases	56	100.0
Excluded ^a	0	.0
Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Coverage of humanitarian logistics courses in local universities or colleges.	5.23	6.000	.767	.858
Availability of competent logistics manpower for recruitment from the local community.	5.27	5.545	.792	.834
Opportunities to attend advanced field training in humanitarian logistics.	5.32	5.204	.796	.833

ADEQUATE USE OF IT (AUIT)

/VARIABLES=AUIT1 AUIT2 AUIT3

/SCALE ('ALL VARIABLES') ALL

/MODEL=ALPHA.

Reliability Statistics

Cronbach's Alpha	N of Items
.884	3

Case Processing Summary

	N	%
Valid Cases	56	100.0
Excluded ^a	0	.0
Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Ability to disseminate accurate and timely information of what is in the pipeline inventory.	5.07	4.613	.854	.766
Use of automated systems or mechanisms to increase logistics efficiency.	5.25	5.355	.701	.898
Access to necessary logistics information from data base of other organizations.	5.04	4.399	.782	.834

INSTITUTIONAL LEARNING (IL)

/VARIABLES=IL1 IL2 IL3

/SCALE ('ALL VARIABLES') ALL

/MODEL=ALPHA.

Reliability Statistics

Cronbach's Alpha	N of Items
.854	3

Case Processing Summary

	N	%
Valid	56	100.0
Cases Excluded ^a	0	.0
Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Stability of logistics staff compared to the outgoing ones.	5.14	4.525	.669	.866
Experience sharing through group brainstorming sessions & regular logistics workshops.	5.32	4.949	.752	.773
Formal records of failure or success stories of past logistics experiences.	5.21	5.081	.778	.756

SUFFICIENT COLLABORATION (SC)

/VARIABLES=SC1 SC2

/SCALE ('ALL VARIABLES') ALL

/MODEL=ALPHA.

Reliability Statistics

Cronbach's Alpha	N of Items
.769	2

Case Processing Summary

	N	%
Valid	56	100.0
Cases Excluded ^a	0	.0
Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Sharing resources such as field sites warehouses and vehicles with other NGOs or partners.	2.57	1.704	.625	.
Working together with NGOs or other partners for joint logistics set up & implementation.	2.50	1.673	.625	.

GOVERNMENT SITUATIONAL FACTOR (GSF)

/VARIABLES=GSF1 GSF2 GSF3 GSF4

/SCALE ('ALL VARIABLES') ALL

/MODEL=ALPHA.

Reliability Statistics

Cronbach's	N	of
Alpha	Items	
.734	4	

Case Processing Summary

	N	%
Valid	56	100.0
Cases Excluded ^a	0	.0
Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Adequacy of assistance from the government for humanitarian operations.	10.4464	9.270	.488	.697
Suitability of customs clearing process for logistics performance.	10.8929	9.406	.469	.709
Feelings of protected safe & secured when working in remote areas.	10.4286	9.995	.511	.683
Flexibility of local governments to allow staff deployment from other localities or Addis Ababa.	10.5000	8.764	.647	.603

INFRASTRUCTURAL SITUATIONAL FACTOR (ISF)

/VARIABLES=ISF1 ISF2 ISF3 ISF4

/SCALE ('ALL VARIABLES') ALL

/MODEL=ALPHA.

Case Processing Summary

		N	%
Cases	Valid	56	100.0
	Excluded ^a	0	.0
	Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.897	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Availability of all-weather alternative roads for use to field sites when main roads are damaged or blocked.	8.32	10.477	.819	.848
Adequacy or stability of electric utilities	8.16	12.465	.644	.910
Adequacy or stability of water utilities	8.05	10.488	.826	.846
Adequacy or stability of communications utilities	8.25	11.245	.801	.856

SOCIOECONOMIC SITUATIONAL FACTOR (SESF)

/VARIABLES=SESF1 SESF2 SESF3 SESF4 SESF5 SESF6

/SCALE ('ALL VARIABLES') ALL

/MODEL=ALPHA.

Reliability Statistics

Cronbach's Alpha	N of Items
.890	6

Case Processing Summary

	N	%
Valid Cases	56	100.0
Excluded ^a	0	.0
Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Acceptance of humanitarian services despite gender difference.	14.52	23.491	.696	.873
Stability of beneficiaries' demand in terms of volume and type of goods & services.	14.52	24.109	.619	.887
Ability of local suppliers to understand purchase request or purchase order or specifications.	14.38	23.111	.742	.865
Ability of local suppliers to understand humanitarian context and their willingness to be flexible during business transactions.	14.52	24.727	.717	.870
Stability of prices for humanitarian goods and services.	14.29	23.917	.751	.864
Capacity of local market to replenish humanitarian goods and services.	14.30	24.797	.750	.866

ENVIRONMENTAL SITUATIONAL FACTOR (ESF)

/VARIABLES=ESF1 ESF2 ESF3

/SCALE ('ALL VARIABLES') ALL

/MODEL=ALPHA.

Reliability Statistics

Cronbach's Alpha	N of Items
.730	3

Case Processing Summary

	N	%
Valid Cases	56	100.0
Excluded ^a	0	.0
Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Favorability of storage areas to goods stored in the warehouse.	5.68	2.477	.585	.608
Suitability of work environment for Physical & mental wellbeing of logisticians.	5.50	2.255	.474	.760
Capability of timely moving goods & manpower during rainy seasons.	5.61	2.461	.622	.570

PERFORMANCE OF HUMANITARIAN LOGISTICS (PoHL)

/VARIABLES=PoHL1 PoHL2 PoHL3 PoHL4 PoHL5 PoHL6 PoHL7

/SCALE ('ALL VARIABLES') ALL

/MODEL=ALPHA.

Reliability Statistics

Cronbach's Alpha	N of Items
.870	7

Case Processing Summary

	N	%
Valid	56	100.0
Cases Excluded ^a	0	.0
Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Utilization of inventory within grant life time or before the expiry dates.	17.00	29.345	.670	.849
Spending of money as per the budget or procurement plan.	17.07	29.558	.681	.847
Purchasing of goods & services as per beneficiaries demand.	16.98	30.272	.578	.862
Dispensing of aids to all targeted beneficiaries.	17.02	29.909	.709	.844
Consistent response to unplanned requests for goods & services within planned leadtime or less.	17.02	31.145	.674	.850
Consistent delivery of any given quantity or volume of commodity.	17.04	31.090	.567	.862
Consistent delivery of all list of assorted items for emergency and dignity kits.	17.02	29.109	.666	.849

ANNEX2. CROSS-TAB STATISTICS

Cross-tab: Work experience versus variables of the study

Work Experience		RoL	ADF	APS	AUIT	IL	SC	MP	GSF	ISF	SESF	ESF	PoHL
Less than 1 year	% of Total N	1.80%	1.80%	1.80%	1.80%	1.80%	1.80%	1.80%	1.80%	1.80%	1.80%	1.80%	1.80%
	Mean	3.5	2.5	1.33	1.0	1.67	1	4	4.25	2	2	2.67	2.29
	Std. Deviation	.	.	.	.	.	.	.	.	.	.	.	.
1-5 years	% of Total N	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
	Mean	3.73	2.54	2.75	2.64	2.68	2.68	3.89	3.29	2.83	3.04	2.85	2.88
	Std. Deviation	1.09	1.12	1.29	1.14	1.07	1.22	1.03	0.95	1.12	1.00	0.86	0.98
6-10 years	% of Total N	42.90%	42.90%	42.90%	42.90%	42.90%	42.90%	42.90%	42.90%	42.90%	42.90%	42.90%	42.90%
	Mean	3.58	2.42	2.56	2.53	2.63	2.42	4.17	3.69	2.57	2.74	2.74	2.79
	Std. Deviation	1.10	1.10	1.00	1.01	1.12	1.12	0.92	0.98	1.09	0.89	0.61	0.84
Over 10 years	% of Total N	5.40%	5.40%	5.40%	5.40%	5.40%	5.40%	5.40%	5.40%	5.40%	5.40%	5.40%	5.40%
	Mean	2.00	2.67	2.67	2.56	2.22	2.67	4.33	4.17	3.33	2.83	2.89	2.95
	Std. Deviation	1.73	1.04	1.20	0.84	0.69	1.26	0.58	1.01	1.04	1.53	0.19	1.11
Total	% of Total N	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Mean	3.57	2.49	2.64	2.56	2.61	2.54	4.04	3.52	2.73	2.88	2.80	2.84
	Std. Deviation	1.16	1.08	1.15	1.06	1.06	1.17	0.95	0.98	1.10	0.97	0.73	0.90

Cross-tab: Education versus variables of the study

Education		RoL	ADF	APS	AUIT	IL	SC	MP	GSF	ISF	SESF	ESF	PoHL
Masters	% of Total N	14.3 %	14.3 %	14.3 %	14.3%	14.3 %	14.3 %	14.3 %	14.3 %	14.3%	14.3%	14.3 %	14.3%
	Mean	3.81	1.88	2.00	2.08	1.63	2.19	4.13	3.28	1.88	2.88	2.42	2.25
	Std. Deviation	0.65	0.88	0.78	0.43	.72	1.31	0.83	0.99	0.91	1.02	0.46	0.60
Degree	% of Total N	67.9 %	67.9 %	67.9 %	67.9%	67.9 %	67.9 %	67.9 %	67.9 %	67.9%	67.9%	67.9 %	67.9%
	Mean	3.59	2.41	2.52	2.39	2.61	2.51	4.29	3.56	2.64	2.75	2.82	2.75
	Std. Deviation	1.17	0.91	1.02	0.98	.95	1.13	0.61	1.03	0.93	0.98	0.73	0.80
Diploma	% of Total N	17.9 %	17.9 %	17.9 %	17.9%	17.9 %	17.9 %	17.9 %	17.9 %	17.9%	17.9%	17.9 %	17.9%
	Mean	3.30	3.30	3.60	3.60	3.40	2.90	3.00	3.58	3.75	3.42	3.00	3.63
	Std. Deviation	1.48	1.44	1.38	1.13	1.11	1.24	1.41	0.80	1.14	0.76	0.83	1.03
Total	% of Total N	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
	Mean	3.57	2.49	2.64	2.56	2.61	2.54	4.04	3.52	2.73	2.88	2.80	2.84
	Std. Deviation	1.16	1.08	1.15	1.06	1.06	1.17	0.95	0.98	1.10	0.97	0.73	0.90

ANNEX3. TABLES of DISCRIPIVES STATISTICS

Table1. The demographic information of the main survey sample.

Demographics		Frequency	Percent	Cumulative Percent
Valid	Female	14	25.0	25.0
	Male	42	75.0	100.0
	Total	56	100.0	
Valid	25 or below	5	8.9	8.9
	26-40	50	89.3	98.2
	56 or above	1	1.8	100.0
	Total	56	100.0	
Valid	Assistant	13	23.2	23.2
	Officer	37	66.1	89.3
	Manager	5	8.9	98.2
	Senior Manager	1	1.8	100.0
	Total	56	100.0	
Valid	Less than 1 year	1	1.8	1.8
	1-5 years	28	50.0	51.8
	6-10 years	24	42.9	94.6
	Over 10 years	3	5.4	100.0
	Total	56	100.0	
Valid	Masters degree	8	14.3	14.3
	Degree	38	67.9	82.1
	Diploma	10	17.9	100.0
	Total	56	100.0	

Source: primary data from main survey, 2015.

Table2. Recognition of logistics

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
Involvement of logistics staffs in organizational decision making process	6	10.7	5	8.9	12	21.4	21	37.5	12	21.4	56
Involvement of logistics staffs in humanitarian need assessment during startup of emergency & development projects	3	5.40	8	14.3	12	21.4	16	28.6	17	30.4	56

Source: primary data from survey, 2015.

Table3. Adequate professional staff

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
Coverage of humanitarian logistics courses in local universities or colleges	12	21.4	12	21.4	17	30.4	12	21.4	3	5.4	56
Availability of competent logistics manpower for recruitment from	10	17.9	20	35.7	14	25	4	7.1	8	14.3	56

the local community											
Opportunities to attend advanced field training in humanitarian logistics	16	28.6	11	19.6	16	28.6	6	10.7	7	12.5	56

Source: primary data from main survey, 2015.

Table 4. Adequate use of information technology.

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
Ability to disseminate accurate and timely information of what is in the pipeline inventory	10	17.9	18	32.1	16	28.6	8	14.3	4	7.1	56
Use of automated systems or mechanisms to increase logistics efficiency	13	23.2	19	33.9	12	21.4	11	19.6	1	1.8	56
Access to necessary logistics information from data base of other organizations	11	19.6	18	32.1	14	25	6	10.7	7	12.5	56

Source: primary data from main survey, 2015.

Table5: Institutional learning

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
Stability of logistics staff compared to the outgoing ones.	14	25	12	21.4	14	25	9	16.1	7	12.5	56
Experience sharing through group brainstorming sessions & regular logistics workshops.	12	21.4	18	32.1	14	25	9	16.1	3	5.4	56
Formal records of failure or success stories of past logistics experiences.	10	17.9	17	30.4	14	25	14	25	1	1.8	56

Source: primary data from main survey, 2015.

Table6: Collaboration

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
Sharing resources such as field sites warehouses and vehicles with other NGOs or partners	15	26.8	17	30.4	10	17.9	9	16.1	5	8.9	56
Working together with NGOs or other partners for joint logistics set up & implementation	15	26.8	13	23.2	15	26.8	7	12.5	6	10.7	56

Source: primary data from main survey, 2015.

Table7. Measuring performance of logistics

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
Extent of logistics performance improvement as a result of measuring it	0	0	6	10.7	6	10.7	24	42.9	20	35.7	56

Source: primary data from main survey, 2015.

Table8: Government situational factors.

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
Adequacy of assistance from the government for humanitarian operations	7	12.5	4	7.1	12	21.4	12	21.4	21	37.5	56
Suitability of customs clearing process for logistics performance	10	17.9	8	14.3	9	16.1	19	33.9	10	17.9	56
Feelings of protected safe & secured when working in remote areas	2	3.6	10	17.9	10	17.9	17	30.4	17	30.4	56
Flexibility of local governments to allow staff deployment from other localities or Addis Ababa	4	7.1	8	14.3	13	23.2	13	23.2	18	32.1	56

Source: primary data from main survey, 2015.

Table9: Infrastructural situational factor

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No	%	No	%	No.	%	No.	%	No.	%	
Availability of all-weather alternative roads for use to field sites when main roads are damaged or blocked	15	26.8	13	23.2	12	21.4	11	19.6	5	8.9	56
Adequacy or stability of electric utilities	10	17.9	13	23.2	16	28.6	14	25	3	5.4	56
Adequacy or stability of water utilities	10	17.9	14	25.0	12	21.4	13	23.2	7	12.5	56
Adequacy or stability of communications utilities	11	19.6	15	26.8	15	26.8	11	19.6	4	7.1	56

Source: primary data from main survey, 2015.

Table10: Socioeconomic situational factor

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
Acceptance of humanitarian services despite gender difference.	10	17.9	16	28.6	13	23.2	10	17.9	7	12.5	56
Stability of beneficiaries' demand in terms of volume and type of goods & services	13	23.2	11	19.6	12	21.4	15	26.8	5	8.9	56

Ability of local suppliers to understand purchase request or purchase order or specifications	8	14.3	14	25	17	30.4	8	14.3	9	16.1	56
Ability of local suppliers to understand humanitarian context and their willingness to be flexible	10	17.9	9	16.1	22	39.3	13	23.2	2	3.6	56
Stability of prices for humanitarian goods and services	5	8.9	15	26.8	17	30.4	12	21.4	7	12.5	56
Capacity of local market to replenish humanitarian goods and services	3	5.4	16	28.6	21	37.5	10	17.9	6	10.7	56

Source: primary data from main survey, 2015.

Table11: Environmental situational factor

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
Favorability of storage areas to goods stored in the warehouse	4	7.1%	18	32.1%	24	42.9%	10	17.9%	0	0.0%	56
Suitability of work environment for Physical & mental wellbeing of logisticians	5	8.9%	14	25.0%	22	39.3%	12	21.4%	3	5.4%	56
Capability of timely moving goods & manpower during rainy seasons	3	5.4%	17	30.4%	25	44.6%	11	19.6%	0	0.0%	56

Source: primary data from main survey, 2015.

Table12: Adequate donors funding

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
Sufficiency of donors funding for logistics infrastructure & capabilities	15	26.8	16	28.6	13	23.2	12	21.4	0	0.0	56
Sufficiency of donors funding for long term disaster preparedness.	13	23.2	18	32.1	11	19.6	7	12.5	7	12.5	56

Source: primary data from main survey, 2015.

Table13.Performance of humanitarian logistics

Item	To no extent		To a little extent		To a moderate extent		To a great extent		To a very great extent		Total
	No	%	No	%	No	%	No	%	No	%	
Utilization of inventory within grant life time or before the expiry dates.	10	17.9	13	23.2	13	23.2	15	26.8	5	8.9	56
Spending of money as per the budget or procurement plan.	9	16.1	16	28.6	14	25	12	21.4	5	8.9	56
Purchasing of goods & services as per beneficiaries demand.	9	16.1	14	25	16	28.6	9	16.1	8	14.3	56
Dispensing of aids to all targeted beneficiaries.	7	12.5	16	28.6	16	28.6	13	23.2	4	7.1	56
Consistent response to unplanned requests for goods & services within planned lead-time or less.	4	7.1	20	35.7	16	28.6	13	23.2	3	5.4	56
Consistent delivery of any given quantity or volume of commodity.	7	12.5	18	32.1	15	26.8	10	17.9	6	10.7	56
Consistent delivery of all list of assorted items for emergency and dignity kits.	12	21.4	9	16.1	17	30.4	12	21.4	6	10.7	56

Source: primary data from main survey, 2015.

ANNEX4. NORMALITY TEST RESULT

Normality test

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
RoL	56	1.00	5.00	3.5714	1.16162	-.766	.319	-.456	.628
ADF	56	1.00	4.50	2.4911	1.08079	.461	.319	-.943	.628
APS	56	1.00	5.00	2.6369	1.14993	.459	.319	-.945	.628
AUIT	56	1.00	4.67	2.5595	1.06384	.596	.319	-.576	.628
IL	56	1.00	4.67	2.6131	1.06321	.242	.319	-1.182	.628
SC	56	1.00	5.00	2.5357	1.17108	.527	.319	-.908	.628
MP	56	2.00	5.00	4.0357	.95278	-.858	.319	-.040	.628
GSF	56	1.00	5.00	3.5223	.97733	-.643	.319	-.374	.628
ISF	56	1.00	4.75	2.7321	1.09530	.215	.319	-1.117	.628
SESF	56	1.17	4.83	2.8839	.96970	.065	.319	-.965	.628
ESF	56	1.33	4.33	2.7976	.72663	.303	.319	-.149	.628
PoHL	56	1.14	4.57	2.8367	.90409	.327	.319	-.939	.628
Valid N (listwise)	56								

ANNEX5. MULTICOLLINEARITY TEST RESULT

Multicollinearity test

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-0.247	0.318		-0.888	0.393		
	RoL	-0.009	0.033	-0.012	-0.075	0.056	0.666	1.503
	ADF	0.191	0.049	0.228	0.092	0.29	0.335	2.984
	APS	0.179	0.052	0.228	0.075	0.283	0.269	3.711
	AUIT	0.072	0.05	0.085	-0.028	0.173	0.34	2.941
	IL	0.112	0.053	0.132	0.006	0.218	0.304	3.293
	SC	0.031	0.031	0.041	-0.032	0.095	0.706	1.416
	MP	0.014	0.037	0.014	-0.061	0.089	0.756	1.323
	GSF	0.083	0.037	0.09	0.009	0.157	0.741	1.349
	ISF	0.14	0.048	0.17	0.043	0.237	0.34	2.943
	SESF	0.123	0.042	0.132	0.039	0.208	0.573	1.746
	ESF	0.188	0.071	0.151	0.046	0.331	0.36	2.774
a. Dependent Variable: PoHL								

ANNEX6. REGRESSION RESULT

REGRESSION

/MISSING LISTWISE
 /STATISTICS COEFF OUTS CI (95) R ANOVA COLLIN TOL CHANGE
 /CRITERIA=PIN (.05) POUT (.10)
 /NOORIGIN
 /DEPENDENT PoHL
 /METHOD=ENTER RoL ADF APS AUIT IL SC MP GSF ISF SESF ESF
 /SCATTERPLOT= (*ZRESID,*ZPRED)
 /RESIDUALS DURBIN HISTOGRAM (ZRESID) NORMPROB (ZRESID).

Variables Entered/Removed^a

Mode l	Variables Entered	Variables Removed	Method
1	ESF, MP, RoL, SC, GSF, SESF, AUIT, ADF, IL, ISF, APS ^b	.	Enter

a. Dependent Variable: PoHL

b. All requested variables entered.

Model Summary^b

Model	R	R Square	Adjust ed R Square	Std. Error of the Estimate	Change Statistics					Durbin- Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.974 ^a	.949	.936	.22863	.949	74.185	11	44	.000	1.564

a. Predictors: (Constant), ESF, MP, RoL, SC, GSF, SESF, AUIT, ADF, IL, ISF, APS

b. Dependent Variable: PoHL

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	-.247	.318		-.778	.441	-.888	.393		
RoL	-.009	.033	-.012	-.282	.779	-.075	.056	.666	1.503
ADF	.191	.049	.228	3.874	.000	.092	.290	.335	2.984
APS	.179	.052	.228	3.473	.001	.075	.283	.269	3.711
AUIT	.072	.050	.085	1.457	.152	-.028	.173	.340	2.941
IL	.112	.053	.132	2.125	.039	.006	.218	.304	3.293
SC	.031	.031	.041	1.003	.321	-.032	.095	.706	1.416
MP	.014	.037	.014	.365	.717	-.061	.089	.756	1.323
GSF	.083	.037	.090	2.265	.028	.009	.157	.741	1.349
ISF	.140	.048	.170	2.900	.006	.043	.237	.340	2.943
SESF	.123	.042	.132	2.932	.005	.039	.208	.573	1.746
ESF	.188	.071	.151	2.662	.011	.046	.331	.360	2.774

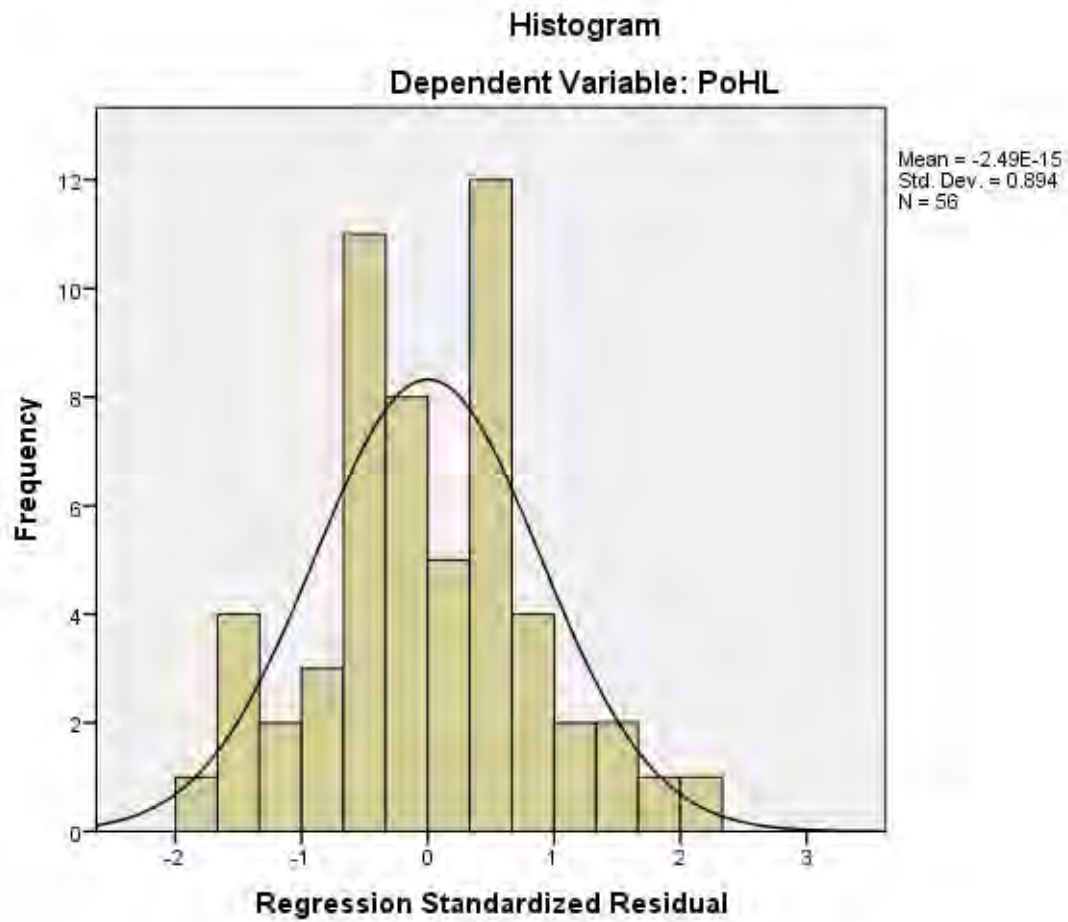
a. Dependent Variable: PoHL

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.3502	4.5350	2.8367	.88066	56
Residual	-.45194	.52399	.00000	.20449	56
Std. Predicted Value	-1.688	1.928	.000	1.000	56
Std. Residual	-1.977	2.292	.000	.894	56

a. Dependent Variable: PoHL

Charts



Normal P-P Plot of Regression Standardized Residual

Dependent Variable: PoHL

