St. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

SOLID WASTE MANAGEMENT PRACTICE AND

FACTORS INFLUENCING ITS EFFECTIVENESS.

THE CASE OF SELECTED PRIVATE WASTE COLLECTING

COMPANIES IN ADDIS ABABA.

BY:

GETNET ZEMENA MUCHE

ID : SGS/0183/2007A

JUNE, 2016

ADDIS ABABA, ETHIOPIA

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A THESIS IS SUBMITTED TO St.MARY'S UNIVERSITY, SCHOOL OF GRADUATE STUDIES IN THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION.

UNDER THE GUIDANCE OF:

CHALACHEW GETAHUN (PhD)

JUNE, 2016

ADDIS ABABA, ETHIOPIA

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BY: GETNET ZEMENA

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DECLARATION

I, the undersigned, declare that this study entitled " Solid waste management practice and factors influencing its effectiveness : The case of selected private solid waste collecting companies in Addis Ababa " is prepared with my own effort . I have made it independently with the close advice and guidance of my advisor.

Name : Getnet Zemena

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Date: --------------------------------

ENDORSEMENT

This thesis has been submitted to St. Mary 's University, School of Graduate Study examination with my approval as a university advisor.

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ABSTRACT

Solid waste, which is a consequence of day -to- day activity of human kinds, needs to be managed properly. Addis Ababa faces problems associated with a poorly managed solid waste system. A rational behind for the study was the poor status of solid waste management in Addis Ababa and this created the need to study the current solid waste management practice and factors influencing its effectiveness the case of private companies in Addis Ababa. Solid waste management practice effectiveness was described in collection, disposal and transportation while factors influencing solid waste management practice effectiveness were described in financial, technical, institutional, social and political aspects. This employed mixed research approach. Collected data has been analyzed by descriptive statistical and correlation statistical tools and the data collection instruments were questioners', interview, observation, and secondary sources. A survey was conducted in three selected private waste managing companies and the survey questionnaire data was collected from 108 respondents and interview was conducted for three key informants from solid waste management agency. Different sampling methods like purposive sampling stratified sampling, and simple random sampling were employed to select the study units. The validity of research instruments was established by consulting the supervisor the researcher employed the test and retest method to establish the reliability of the research instruments .The researcher used statistical packages for Social Science to analyze the data. The study found out that the current waste service delivering practice is ineffective due to the financial constraints, technical problem, social influence and institutional aspect problems as major influencing factors. However, the political influence was moderate. Indeed, these influencing factors possessed association with solid waste management (collection, transportation, and disposal) separately. This indicates that the higher the influences, the lower the effectiveness of solid waste management practices. Based on the findings of this study , it is recommended strict enforcement of -by law and policy, more budget allocation ,technical support by the government, development of solid waste management through waste reduction, reuse, and recycling ,retain staff with good salary ,benefit, and training ,implement awareness raising program.

*Key Words: **Effectiveness, Financial, Institutional, Technical, Political Aspects, Social aspect , SWM***

List of Abbreviations

AACA	Addis Ababa City Authority
AACSAA	Addis Ababa city Sanitation Administration Agency
ADB	Asia Development bank.
CCA	Cleaning Administration agency
EPA	Environmental protection Authority
FDRE	Federal Democratic Republic of Ethiopia
NGO	Non-Governmental Organization
PPIAE	Public Private infrastructure Advisory Faculty
SMEs	Micro and Small Enterprise
SWM	Solid Waste Management
UN	United Nation
UN - Habitat	United Nations Human Settlement
UNEP	United Nation Environment Program
UNIDO	United Nations Industrial Development Organization
WHO	World Health Organization

CHAPTER ONE

1. Introduction

In Addis Ababa solid waste management has undergone several reforms and organizational changes in line with neoliberal and good governance policies, with the aim of improving the urban services provided in the city. Today, the service provided has not changed for the better. This study aims to give a critical view of solid waste management practice and to identify factors influencing its effectiveness the case of selected private solid waste managing companies in the city.

1.1 Background

Solid waste management is becoming the big concern for cities administration task in developing countries mainly due to the magnitude of rapid urbanization and increasing population growth which in turn have greatly accelerated municipal solid waste generation rate in the urban environment. (Hayal Desta, 2014) . According to World Bank (2012), every year developing nations spend some US$46 billion on managing their municipal solid waste, and these investments could exceed US$150 billion per year by 2025.

In most African cities the situation of solid waste management is insignificant and inadequate that could associate with different factors. The United Nation Environment Program (UNEP,2005) notes that the management of solid waste in Africa is often weak due to lack of appropriate planning, inadequate governance, poor technology, weak enforcement of existing legislation and the lack of economic incentives to promote environmentally sound development. The practice of solid waste management in the region is mostly open dumps without proper control over ecologically sensitive areas. According to UNEP (2004), this has resulted in refuse heaps being dumped in the urban landscape in heavily populated cities as typically only about 40 to 50 percent of waste is reportedly being collected United Nations Industrial Development (UNIDO, 2009).

This large amount of solid waste generation has become one of the serious challenges for the environment and public health. Particularly it is more serious in developing continents/ countries, like Africa (UNEP, 2004).

Different approaches are used by countries to manage solid waste in order to prevent its impacts on the environment and health. Until recently, solid waste management (SWM) services in Ethiopia were mainly the responsibilities of municipalities, which results in inadequate service provision reflected by lack of proper collection, poor sanitary facilities, improper planning and coordination (Tadesse Kuma, 2004 ; Edmealem Bewuket, 2013).

The inadequate solid waste management   vice provision forced the government to introduce a new SWM proclamation No.513/2007; this law allows the private sectors to participate on the solid waste collection, transportation, reuse and disposal of waste (Public Private infrastructure Advisory Faculty (PPIAF, 2011)

Addis Ababa is the capital city of Ethiopia with an area of $530km^2$; a population of 3.5 million lives in 10 sub-cities which are then subdivided into 116 districts (Hayal Desta et al., 2014). It is the center for modern economic and social activities that infrastructure services are found relatively in a better situation than other cities of Ethiopia. However, their development is too slow to meet the demands of the increasing population due to both natural growth and rural- urban migration. In particular, the complete inadequacy of the dry waste management service is major environmental and health problem in Addis Ababa (Tadesse Kuma, 2004).

The daily waste generation is estimated 0.4kg/capita/day. The current daily waste generation of the city is $2,297m^3$ or 851 tone. Of this, 65 percent ($1,482m^3$) is collected United Nation (UN,2010). The remaining 35 percent of waste is disposed of through informal means, except smaller percentage going to incineration and dumped on open sites, drainage channels, rivers and valleys as well as on the streets.

In developing countries like Ethiopia, the role of private actors in the business sector is imperative. Furthermore, the study conducted by Irfan (2012), supports the importance of private sector participation for greater efficiency and enhanced performance due to the introduction of competition, stronger experience, and technical capabilities, more flexible organizations and better management and accountability. Faster response, associated with the ability of private organizations to raise capital, along with a better service, associated with the business image expo-sure from the private sector, are also key success factors.

Despite the micro enterprises' and private companies involvement as integrated solid waste management put in place by the city administration in the study area, there still remain serious challenges such as low service coverage, high operational cost, bad attitude of people towards waste management, poor quality of service, and the associated low customer satisfaction (Fikru Tesema, 2010)

This study has examined the current solid waste management practices and factors influencing its effectiveness which is practiced by the private waste collecting companies in Addis Ababa.

1.2. Statement of the problem

One of the most daunting challenges of urban centers in developing countries like Ethiopia is proper waste management challenge (Nigatu Regassa, Rajan , Sundarra & Bizunesh Bogale, 2011).

The range of solid waste management problem, including inadequate waste collection, transportation systems and inadequate waste handling and improper final disposal results environmental pollution around urban areas. These problems are aggravated by the growing waste generation rates associated with population growth, rapid urbanization, and change of composition of waste and economic condition of population (Degnet Abebaw, 2008; Getahun Tadesse, 2011).

Currently in Addis Ababa, solid waste is increasing beyond the management capacity of the municipal governors, the volume of waste totals more than three million cubic meters per year with the prospect of increase by a constant rate of 2.1 cubic meters per person annually (Misrak Workneh,2016). However, the (2010) estimate of UN shows that only 65 percent of the waste generated in the city is collected, having the rest being disposed of in open sites, drainage channels, and rivers. This fact can be observed by strolling on the street of Addis Ababa city, where residents might not find it strange to see overflowing garbage skips often rendered for their putrid smell. The best remedies, individuals can do in such a scenario is to cover their nose or hold their breaths and walk (Misrak Workneh, (2016, March 27).

Due to the above paradox, the government had structured a process where SMEs and privately owned sanitation companies work with the government's sanitation entities in line with proclamation No.513/2007.

Despite, government's procedural mechanisms put in place to cope with the above problem, the matter of solid waste disposal seems far from being resolved due to the lack of technology, technical knowhow, financial capacity, institutional structure and understanding of the community required to properly manage solid wastes by the service providers.

This improper and weak waste disposal eventually causes public health problems, aesthetic nuisance, and environmental pollution. According to Aklilu Amiga (2002), risks associated with inadequate solid waste management are human health, environmental and aesthetic risks. Human health risks involve disease caused by pathogenic organisms; disease caused by insects, rodent vectors, and water and air pollution related diseases. World Health Organization (WHO , 1992) reported that about (90%) of the diseases occurring in developing countries result from bad sanitation and related consequences. For instance, from annual morbidity report of Addis Ababa for 1997-1999 the spread of top 10 diseases was; parasitic infection, bronchitis, skin diseases, pneumonia, typhoid, dysentery, bronchial asthma and allergic, influenza and, trachoma conditions are proved to be solid waste related disease. Thus, the health situation of the community is under serious threat (Environmental Development Action in the Third World (ENDA, 2006). Waste problems impair, in the long run, not only the quality of life of the urban poorer communities but also affect the welfare of the entire urban population`(Oduro-Kwarteng , 2006).

Most studies conducted so far on this topic gave more emphasis to issues like; "willingness to pay" (Aklilu Amiga, 2002) "waste generation rate" (Lemma Assefa, 2007), ''developing new sanitary landfill and transfer stations" (Tadesse Kuma, 2004), even special emphasis were given to the "Overview of solid waste management" (Tadesse Kuma ,2004 and Fikru Tesema,2010). Edmealem Bewuket (2013) tried to explore the sustainability of solid waste collection and transport services by MSEs in Bahir Dar and which government mechanisms are used to support sustainable service delivery by MSEs, by selecting two sample MSEs using randomly. He was concluded his finding as MSEs were partially sustainable and he was lso calling for further study on the effectiveness of private limited waste collectors.

These past studies could not evident the basic factors which have hindered the management of solid waste in Addis Ababa, which consequently un enable to escalate an efficient and effective means of SWM capacity. If these factors are not demarcated, it becomes difficult to design appropriate SWM strategies in the study area. This gap directed the researcher to examine about the current solid waste management practice and influencing factors at private collector's level

Therefore, it is imperative to study the institutional problems for improved and sustainable waste management.

1.3 Research questions

General research question : What is the status of current solid management practice and which factors are influencing its effectiveness?

1.3.1 Specific research questions

This study will answer the following specific research questions:

1. What is the status of current solid waste service delivery practice?
2. Which factors influence the effectiveness of solid waste management practice in Addis Ababa?
3. What is the association between the influencing factors of SWM and effective solid waste management practice?

1.4 Objective of the study

The general objective of the study is to examine the current solid waste management practice and factors influencing its effectiveness which is managed by private companies in Addis Ababa.

1.4.1 Specific objective of the study

1. To assess the current solid waste management practice in Addis Ababa.
2. To identify factors that influence effective solid waste management practice which is managed by private firms in Addis Ababa.
3. To assess the association between influencing factors and effectiveness of solid waste management.

1.5. Significance of the study

The study wanted to contribute on the current solid waste management practice and its influencing factors on the selected private companies in Addis Ababa. Accordingly, the study would have the following significances.

To show private companies and municipality about the current practice of solid waste management

To give clear understanding for private companies and municipality on how financial, technical, social, institutional and political aspects influences solid waste management effectiveness (collection, disposal and transportation) and in such can use recommendation for the problem remedial.

To show private companies and municipality the relationship between influencing factors and SWM practice effectiveness and it helps them to apply what researcher recommended for remedial of problems.

For researcher: It can be serving as a base point to conduct further research on this area.

1.6 Scope and limitation of the study

The researcher faced different limitation while conducted this thesis paper. Due to time and cost constraint, the researcher surveyed three private solid waste managing companies for their convince to collect data.

From 176 target population in the three selected companies, the researcher sampled 121 employees based on statistical determination rule. However, after the researcher personally contacted some of them, of sample size determined (121), only 108 employees were made to participate in filling the questionnaire. Besides, the researcher was coerced to translate the questionnaire from English to Amharic for the cause of language barrier for workers engaged in the capacity of non clerical operations with the intention of minimizing the language gap in the study process. In addition to the data collected in survey method, the researcher used on site observation while they disposes the collected waste.

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1.7 Definitions of terms and conditions

In this section, a number of concepts and terminologies are explained by World Bank, (2004). This includes:

Waste : Unwanted materials left over from any human activity..

Collection : The process of picking up wastes from residences, businesses, or a collection point, loading them into a vehicle, and transporting them to a processing site, transfer station or landfill's

Disposal: The final placement of MSW that is not salvaged or recycled. 2. The process of finally disposing of MSW in a landfill.

Effectiveness : the extent to which the service objectives have been met/fulfilled in practice. The waste management model adopted should be able to remove all the waste generated in a given area.

Hazardous Waste: Waste generated during production or other activities by a society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosively, reactivity, or toxicity).

Institutional Aspects: Concerns the distribution of functions and responsibilities of MSWM..

Transportation: The physical process of moving waste.

1.8 Structure of the research

This study has organized into five chapters. The first chapter deals with the problem and its approach including research questions, objectives, scope, and significance of the study and definition of important terms. The second chapter focused on the literature review followed by the third chapter Research Methodology, Fourth chapter data presentation, and analysis. The last chapter has presented the conclusion and recommendation part of the study.

CHAPTER TWO

2. Review of related literature

2.1. Conceptual review on solid waste management

2.1.2 Definition

Waste generally is defined as a material that is thrown away as useless or unwanted thing. Which means all useless wastes discarded from human and animal day to day chores? It includes municipal garbage, industrial and commercial wastes, sewerage slump, waste of agriculture and animal husbandry, demolition waste and mining residues (Tchnobaglous, 1993).

2.1 .3 Solid waste management concept

The business of keeping our environment free from the contaminating effects of waste materials is generally termed waste management. Solid waste management is the process of collecting, storing, treatment and disposal of solid wastes in such a way that they are harmless to humans, plants, animals, the ecology and the environment generally. The unhealthy disposal of solid waste is one of the greatest challenges facing developing countries (Kofoworola, 2007). Gbekor (2003) for instance indicated that waste management involves "the collection, transport, treatment and disposal of waste including after-care of disposal sites". Similarly, Gilpin (1996) has defined waste management as "purposeful, systematic control of the generation, storage, collection, transportation, separation, processing, recycling, recovery and disposal of solid waste in a sanitary, aesthetically acceptable and economical manner ". It can be deduced from these definitions that waste management is the practice of protecting the environment from the polluting effects of waste materials in order to protect public health and the natural environment. Thus, the priority of a waste management system must always be the provision of a cleaning service which helps to maintain the health and safety of citizens and their environment (Cooper, 1999).

Further, Gilpin (1996) regards the business of waste management as a professional practice which goes beyond the physical aspects of handling waste. It also "involves preparing policies, determining the environmental standards, fixing emission rates, enforcing regulations, monitoring air, water and soil quality and offering advice to government, industry and land developers, planners and the public" (Gilpin, 1996).

Waste management therefore, involves a wide range of stakeholders who perform various functions to help maintain a clean, safe and pleasant physical environment in human settlements in order to protect the health and well-being of the population and the environment. However, effective solid waste management is a growing challenge to all countries especially in developing country like Ethiopia.

2.1.4 Types of waste

Solid waste is the type of waste which is non-liquid and believed to comprise organic as well as non-organic materials. Municipal solid waste is a material for which the primary generator abandons it within an urban area and required no combination upon abandonment. In addition, it qualifies as an urban waste if it is generally perceived by the society the responsibility of municipal to collected and disposed of (Cointreou, 1982). According to him, it contains grass, paper, metals, and various household items and street sweeping.

2.2 Current solid waste service delivery practice

Waste management systems are a combination of various phases in the management of the flow of materials within the city. It embraces the flow of materials from generation (source) up to the final treatment and disposal stage(Edmealem Bewuket,2013)

2.2.1 Waste generation rate

According to Environmental Protection Authority and World Bank (2004), the daily waste production of Addis Ababa is estimated to be 2,297 m3 or 765 tons. The waste production rate per person is about 0.45 kg/day. However, there is seasonal variation in the per capita solid waste generation.

From the daily solid waste generated in Addis Ababa, 65% is collected, 5% recycled and 5% composted. The remaining (25%) is simply dumped on open sites, drainage channels, rivers, and valleys as well as on the streets (70%) of the waste generated comes from households, 9% from commercial areas and (6%) street sweeping, (5%) from industrial waste and the remaining from hotels, hospitals (UN, 2010)

2.2.2 Waste source and composition

According to Fikru Tesema (2010), the source of solid waste in Addis Ababa shows (76%) domestic household (18%) instructional, commercial, factories, (6%) , hotels and street sweeping.

The estimated physical composition is as follows: vegetables (4.2%) ,paper (2.5%), rubber/plastics (2.9%), wood (2.3%), bone (1.1%), textiles (2.4%), metals (0.9%), glass (0.5%), combustibles leaves (15.1%), non-combustible stones (2.5%) and all fines (65%)

(Fikru Tesema, 2010). Most of the composition is biodegradable solid wastes that leftover food (kitchen and marketplace), seed coats, grasses, garden wastes, animal wastes, ash, dust, leaves, the scarp of khat, paper, wood scraps, bones, straw, dead animals, cardboard, cartons, and paper packaging materials. This can easily convert into resources in the form of combustible and recycling. Yet this opportunity is not exploited and waste management in Addis Ababa is still a challenge to environmental, health and ascetics.(UN,2010)

2.2.3 The organization of solid waste management

The way that solid waste has been managed and the service provided in Addis Ababa has changed during the last 18 years. The institutional organization of solid waste and the service provided since 1994 can be subdivided into three periods: waste generated through health care, when the responsibility for disposal fell under the Health Department; waste associated with beautification, when the Sanitation, Beautification, and Park Development Authority (SBPDA) had main responsibility for its disposal; and today, when the Solid Waste Authority has the main responsibility for managing waste disposal and the main focus is on integrated solid waste management (ISWM) and recycling. In this section, It describes how solid waste management has been organized and the reasons behind the reorganizations of the Solid Waste Authority (Louise,2013)

From 1994 to 2003, solid waste management was organized under the city health bureau in the Department of Environmental Health Care. The long bureaucratic chain also made it difficult to coordinate the different actors and hindered efficient mobilization and use of resources (SBPDA, 2003).

As part of the national decentralization process in 2003, responsibility for solid waste Management was reorganized so that it came under the Sanitation, Beautification and Park Development Authority (SBPDA).

As part of the reform, departments responsible for solid waste disposal were also established at Sub-City and kebele levels with the aim of decentralizing the services and increasing their efficiency.

In 2009, the SBPDA was reorganized in line with business process re-engineering (BPR). The agency changed its name to the Solid Waste Management Agency and Landfill Project Office.(Louise, 2013)

Addis Ababa City Administration has established the Cleansing Agency to handle the collection and disposal of solid waste in the city. To improve the range of coverage and consistency of service, the Agency has established Sub-city and Woreda Cleansing branch offices and outsourced waste collection services to cooperatives and private firms to provide waste collection and disposal services. (Fikru Tesema,2010)

2.2.4 Elements of effective solid waste collection

The collection and transport of solid waste take the highest demand on municipal budgets and have the greatest impact on urban living. Solid waste collection is taken to include the storage of waste at the household, shop or business premises, and transporting the waste until it reaches its final treatment plant or disposal site (Coffey, M. & Coad, A , 2010).

According to Coffey & Coad (2010), the following issues should be considered during waste collection. These are:

The frequency of waste collection: concerns about the number of times per week or more than a week that waste is collected and it is an important parameter or criterion for any waste collection system. If waste is allowed to accumulate for a longer period of time, it will create unpleasant air pollution. The ambient temperature of the area determines the frequency at which waste should be collected. At high temperatures the breeding cycle of disease-causing organisms such as flies is much faster and leads to offensive odor, so the waste should be collected more frequently, at least twice a week in hot climate (Edmealem Bewuket,2013)

Reliability: it is also very desirable that the frequency should not vary so that household or users as a whole know when their waste will be collected. Unexpected variability in frequency reduces confidence in the waste collection service.

The point of collection: the location at which the waste passes from the control of waste generator to the control of waste collection enterprise/agency. It is another determinant factor in which the generator has the responsibility for taking the waste to the point of collection, and so is concerned about the time and effort required and must be willing to do this work. (Tadesse Takele,2004)

Vehicle type for waste collection and transport: using general purpose vehicles which are inefficient and not suited to a waste collection is a great mistake which is mostly practiced in developing countries. It is also better to take into consideration that old waste collection vehicles are large sources of emissions (Edmealem Bewuket,2013).

According to observation by the researcher, In Addis Ababa solid waste is collected in several ways, including door- to -door collection, collection through community bins, roadside pick-up, and self-delivery

The municipality has responsibility and it spends the large proportion of its budget on a collection, transport, and disposal of solid waste services divided into two sub-systems: primary and secondary collection. To improve the range of coverage and consistency of service, the Agency has established Sub-city and Woreda Cleansing branch offices and outsourced waste collection services. After the introduction of solid waste management proclamation no.513/2007, primary collection system is done by private companies, micro and small enterprises. Addis Ababa City is currently divided into 10 Sub-cities, 116 Woredas each contracted to different management firm responsible for collecting and disposing of solid waste.(Cleaning Administration Agency (CAA ,2015)

The collection of solid waste from these Woredas has been delegated to 529 Small Scale Enterprises and 27 private sectors. The Cleansing Administration Agency concentrates on granting permits to private firms, associations, and cooperatives, direct and co-ordinate waste disposal services and encourage relevant organizations to engage in Solid Waste services, etc. (CAA , 2015).

The sub-cities cleansing offices mainly involve in the provision of technical assistance i.e. assign vehicles.

The Woreda Cleaning Administration Offices concentrates on supervision of waste collection, monitoring of the public-private partnership, management of disposal points and cleaning of main roads/streets. The level of the waste management fee depends on the water consumption and is, therefore, a progressive way of charging households for waste management. Currently, the fee is set at (20%) of the water bill with a minimum amount for households and (42.5%) for commercial (Fikru Tesema, 2010). The Lehulu government agency transfers the waste collection fees to the Woreda administration. The wereda again distributes the fee to waste collectors with according to their collection and transportation capacity. According to Addis Ababa city currently, 720 small enterprises and 27 private companies are engaged in solid waste collection and transportation. The private companies have the service contract to collect and transport from Institutions and Commercial/Retail places. Each company is responsible for specific jurisdiction assigned by the municipality. Their service payment is volume based rate (74.00 Birr) per meter cube. But, recently the payment system is changed from meter cube to kilogram. The micro and small enterprises are responsible for waste management from households (CAA, 2015)

2.2.5 Elements of effective solid waste transfer/ transportation

These activities are associated with a transfer of wastes from public storage facilities to collection vehicle and the subsequent transport of wastes to the disposal site. Transfer refers to a movement of waste or materials from primary collection vehicle to a secondary, larger and more efficient transport vehicle. Transportation on the other hand covers all types of vehicles under operation to transport solid waste from its generation point to transfer station and then to treatment or disposal site (Meenakshi, 2005).

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According to Coffey & Coad, (2010) specifying and implementing the adequate number of small transfer stations are more useful than a single large one. Improper transfer arrangements can cause inefficiencies and scattered waste.

The method of loading waste from the storage material into the collection vehicle must be given careful attention since it has impacts on the health of the workers and the cost of the service. Some methods of loading a waste expose laborers to risks from contacting with the waste, inhaling dust and from traffic accidents (Coffey & Coad , 2010).

According to UN-Habitat (2010), a final waste disposal site should properly be selected and fenced so as to protect the entrance of straying animals and to reduce the impact of waste on the surrounding environment as a whole .Transport of solid waste is carried out by City Administration trucks and private sector vehicles. The existing reality in Addis Ababa where waste transporting tracks are not available to the level demanded and even some of the available trucks don't all fully perform on daily basis attributable to long age, frequent accidents, and maintenance problems. (Hayal Desta, 2014)

2.2.6 Separation, reuse and recycling

Sorting of waste takes place at various levels in the waste management process The first level of source separation is at household: plastic materials, glass, bottles, are considered as valuable and usually sorted out for reuse Several collectors represent the second stage: Street boys, private sector enterprises, scavengers at municipal landfill, and the korale. Recyclable materials include metal, wood, electricity products, old shoes, and plastic (Fikru Tesema, 2010)

The municipality and waste management agencies role in recycling was absent and mainly focus on collection, storage transportation, and disposal of solid waste. Most of the collection of recyclable wastes in the city is performed by the informal sector recyclable materials are used by local plastic, shoe, and metal factories.(Fikru Tesema,2010). However, recently the cleaning Administration is enforcing to separate waste from source

2.2.7 Elements of effective disposal system

This is the final functional element in a solid waste management system. Disposal activities are associated with the final dump of solid wastes directly to a landfill site. Today disposal of wastes by land filling or land spreading is the ultimate fate of all solid wastes whether they are residential wastes or residual materials from materials recovery facilities. "However, in most developed countries this method is officially banned allowing only sanitary landfill for final disposal. Because sanitary landfill is not a dump it is an engineered facility used for disposing of solid wastes on land without creating nuisances or hazards to public health and environment" (Techobanglous , 1993).

Disposal of waste in Addis Ababa city is carried out by City Administration trucks and private sector vehicles. There was one open dumpsite where all collected waste is disposed of. It has been established 47 years ago. The site is known as "Rappi" or "Koshe" which is South West part of the city Located 13 km away from the city center .It has a surface area of 25 hectares. The method of disposal was crude open dumping: hauling the wastes by truck, spreading and leveling by bulldozer and compacting by compactor or bulldozer. The disposal site was one of the identified challenges to the system.

The site was getting full surrounded by housing areas and institutions. Nuisance and health hazard for people living nearby. More than 200 - 300 waste pickers per day, work continuously and obviously living nearby the site and interfering the operation of the work for the collection of salvageable materials such as wood, scrap metals, and discarded food. Moreover, the sanitary was lacking no daily cover with soil, rainwater drains off, odor or vector control, and fence. (Tadesse Kuma,2004 ; Fikru Tesema,2010). Therefore, more acceptable and safer means of waste disposal was vital to cope with the present and future challenges of waste management. Indeed, the Cleansing Administration Agency (CAA) has introduced new disposal site at a place called "Sendafa" near to Oromia. The new disposal is 84 kilometer from the center. However, the newly introduced site has the lack of acceptance by the surrounding community and waste collectors. Since negative externality and far distance traveling needs enough compensation to the community and waste collectors respectively.

2.2.8 Regulations governing solid waste management

Today, there are several laws and regulations concerning the management of solid waste in Addis Ababa. At the national level, the Environmental Protection Authority (EPA) has the main responsibility for implementing laws to protect the urban environment and the management of solid waste. In 1997, EPA in collaboration with Ministry of Economic Development and Cooperation published an environmental policy for Ethiopia, which included aspects of solid waste management (EPA, 1997). However, the first national policy for solid waste was not published until 2007. The aim of the policy was to 'enhance at all levels capacities to prevent the possible adverse impacts while creating economically and socially beneficial assets out of solid waste' (FDRE, 2007: 3525). The policy includes collection, transport, and disposal of solid waste. It refers primarily to the obligations of urban administrations to ensure the proper planning, implementation, and monitoring of solid waste. The focus is on city administrations' responsibilities and on decentralizing responsibilities to the lowest levels of administration in order to fulfill the obligations. In the third part, the proclamation focuses on regulations to manage waste glass, plastic bags, used tires, food, household waste, and construction waste in a sustainable manner and with the focus on proper handling, segregation, reuse, and recycling.

Part 4 deals with transportation and disposal of solid waste, where the focus is on technical inspection of vehicles used for transporting solid waste as well as ensuring proper management of disposal sites in line with the environmental regulations. In 2004, the city administration published a solid waste regulation – the Waste Management Collection and Disposal Regulation of the Addis Ababa City Government (AACA, 2004) – which serves as a framework for how individuals and private enterprises should manage and dispose of their solid waste in a sustainable way (Louise, 2013)

According to the proclamation, Private Investor's roles and responsibilities is to collect solid wastes from hotels, hospitals, government offices, palace, etc using compressor and dump trucks. Daily to train their employees on solid waste handling and they must handle their containers and vehicles clean, dispose of dumped refuse periodically
Despite all the regulations being good in theory, few of them are adopted by the city administration and citizens and very little is done to enforce them (Louise, 2013)

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2.3 Factors influencing effective solid waste management practice

2.3.1 Financial factor

If a system is to be fully sustainable it is essential that all long-term financial costs, as well as short-term operating costs, are taken into account and that procedures are in place for obtaining regular finance to meet these costs. Otherwise, a collection system may be set up which will work well for a short period and then collapse as operating funds (for labor, fuel, and maintenance) run out and the equipment becomes obsolete (Un-Habitat,2010)

Financial resources are concerned with operating cost for waste collection, financial cost, cost recovery and management of funds which are necessary for the safe and reliable collection and disposal of solid waste (Coffey & Coad, 2010). Operating costs are labor cost, fuel cost, and maintenance cost. Likewise, financial cost includes costs to own vehicle and the associated depreciation. Furthermore, the cost of recovery includes refuses collection charge, government grants, and littering fines.(Un -Habitat,2013)

Financial constraints are the main reasons for inadequate collection and disposal of solid waste especially where local governments are weak or underfinanced (Zurbrug, 2002). To ensure the long-term sustainability of SWM systems, investments in systems development should correspond to the level of resources which the society can make available for the waste management (Schubeler ,1996). Unless funds are continuously available without any delay it is impossible to run a regular collection service and any system which has been set up will rapidly come to stop.

In many developing countries, the local authorities are expected to provide services without adequate long-term funding base, often with insufficient funds to even meet their day-to-day operating cost. It is, therefore, essential to have accurate knowledge of the operating and financial cost needed so that long-term financial plans can be developed into account of all the cost of the waste management services (Coffey & Coad, 2010).

2.3.2 Technical factor

According to Schubeler (1996) and Ansari (2012), technical systems established include the collection, transfer, and disposal system knowledge of solids waste. The collection comprises household containers, primary and secondary collection vehicles and equipment, and the organization and equipment of collection workers, including the provision of protective clothing workers. Transfer system deals with the waste storage, and transfer points, vehicles and equipment for waste transfer, and the procedures for operating and maintaining these facilities and equipment (Schubeler, 1996). Disposal knowledge includes ensuring properly designed and correctly operated sanitary landfills and continues monitoring and control of landfills or disposal dumps (Shammas , 2009).

In most developing countries, there is a lack of human resources at both the national and local level with technical expertise necessary for solid waste management planning and operation (Ogwa, 2008).William and Francis (2004), note that technical system, often the "Conventional" collection approach, as developed and used in the industrialized countries, is applied directly in developing countries. The used vehicles are sophisticated, expensive and difficult to operate and maintain, and are often inadequate for the conditions in developing countries.

2.3.3 Social factor and SWM

Effective SWM system is influenced by waste handling patterns and underlying attitude of the urban populations, and people's social and cultural context. Programmers to disseminate knowledge and skills or to improve behavior patterns and attitudes regarding waste management require the sound understanding of the social and cultural characteristics (Shubeler , 1996). Social problems encountered include lack of public awareness, illegal dumping, poor condition of waste workers, and lack of private sector and social involvement Public awareness-raising and attitudes to waste can affect the whole solid waste management system. All steps in SWM starting from household waste storage, to waste segregation, recycling, collection frequency, the amount of littering, the willingness to pay for waste management services, the opposition to the sitting of waste treatment and disposal facilities,

all depend on public awareness-raising and participation. Therefore, this is a crucial issue which determines the success or failure of SWM system (Zurbrug, 2003).

According to Shubeler (1996) and (Un- Habitat ,2013) access to social and health care service should be ensured. Proper equipment and protective clothing can reduce health risks. By contributing to the professionalization of the waste worker's role, proper clothing and equipment may also help to alleviate the social stigmatization which is often associated with waste workers.

2.3.4 Institutional factor and SWM

Effective SWM depends on upon the appropriate distribution of functions responsibilities, authority and revenues and requires the integration of many organizations and groups into a partnership (Shubeler, 1996). Local government is normally responsible for SWM, even if private sector contractors are engaged to provide such services. Small family-based enterprises and informal sector rag pickers are often very involved with SWM. Non-governmental organizations (NGOs) and community-based organizations (CBOs) can have the important impact in organizing local services, raising awareness and supporting vulnerable individuals (Coffey & Coad, 2010).

Appropriate practices in waste management system necessitate clear delineation of jurisdiction and responsibility, with all stakeholders participating in system design, and with those affected (Bernstein , 2004).

Local government authorities are generally responsible for the provision of solid waste collection and disposal services. They become the legal owner of waste once it is collected or put out for collection and the responsibility for SWM is usually specified in bylaws and regulations (Shubeller,1996). Therefore, the policy of government regarding the role of the private sector (formal and informal) should be taken into account (Zurbrug, 2002). Private sector involvement in SWM implies a shift in the principal role of government institutions from service provision to regulation. To effectively regulate and control the enterprises, the appropriate system of monitoring and control need to be established and corresponding skills and capacities developed at both local and central government levels (Shubeller , 1996).

2.3. 5 Political factor

Solid waste management is influenced in numerous ways by the political context. The existing relationship between local and central governments (the effective degree of decentralization, for example), the form and extent of citizens Participation in the public processes of policy making and the role of party politics in local government administration all affect the character of management, governance and the type of MSWM system which is possible and appropriate (Schubeler,1996)

2.4 Empirical literature review

Waste has become a serious problem in developing countries where generation of waste per unit of output is much higher than in the developed countries and this is attributed to inefficiency in manufacturing processes, bad design and ultimately bad decision making. A bulk of prior studies state that SWM is highly inefficient and financial, technical, institutional and social factors pose a serious challenge to the practices of SWM. Here are some of the prior works in developing countries:

Edmealem Bewuket (2013) tried to explore the sustainability of solid waste collection and transport services by MSEs in Bahir Dar and which government mechanisms are used to support sustainable service delivery by MSEs, by selecting two sample MSEs using randomly. His findings revealed that the absence of rivalries in the private waste collectors, their service quality decrement and high service fee of those firms on users led to the establishment of MSEs in Bahir Dar city. In addition, the reasons for the establishment of MSEs include creating jobs for low income poor and keeping the city clean by creating more competition, he wrote.

He found out that MSEs are partly socially sustainable for the reason that they created job spots for the poor people in the city and provide the service for everyone with no discrimination. However, the solid waste collection services by MSEs were not technically, environmentally, financially and institutionally sustainable.

The absence of environmental policy, no waste separation at source, and waste not being timely collected are the explanation for environmental un sustainability.

The author enumerated the following reasons for the un sustainability of services of MSEs generally: a serious shortage of waste transport vehicles which greatly impacted the frequency of waste collection, poorly designed hand carts, absence of waste separation at source, unsafe waste disposal methods, insufficient funding systems, inadequate monitoring and supervision and low enforcement of rules to implement activities as per the local context.

Fianko, (2014) have studied challenges affecting solid waste management system in the Kumasi Metropolis, the study is both exploratory and casual with a sample size of 200 out of a total population of 350 by using Self-Administered Questionnaire as a data collection instrument. Their findings revealed that all the challenges facing solid waste management practices found to be substantial whereas institutional arrangement and adequate solid waste management laws were found not to be major challenges.

These challenges to waste management practices resulted in inefficiency in the solid waste management practices with a correlation coefficient (between them) of 0.51 and correlation of determination of 0.26 or (26%), meaning that the higher the challenges the higher the inefficiency in the waste management system. However, this relationship seems moderate since 74% of the inefficiencies are accounted for by other factors than those identified in this study. Based on the findings of this study, they recommended the management must put measures in place to overcome the challenges facing solid waste management practices.

Hufane (2015) examined challenges facing solid waste management in Borama town, Somaliland, he particularly emphasized on four challenges: financial, technical, social and institutional challenges. The study utilized a census survey research design, and data was collected from all 63 workers of Horseed Sanitation Company through the questionnaire.

The study concluded that technical aspect is the major challenge facing the solid waste management (SWM) in Borama town because it accounts for the largest variance (66.1%) of the challenges facing the SWM in the town. The researcher came up with the recommendations that the Ministry of Health, Borama municipality and all stakeholders concerned with sanitation should allocate enough budgets for the provision of SWM services and development of better waste management that is possible through waste reduction, reuse, and recycling.

More, the government of Somaliland, Borama municipality, and Horseed Sanitation Company should re-train their staff on the knowledge in waste collection, knowledge of

waste transfer and knowledge of disposal, the author recommended. The study also recommends that Borama Municipality and Horseed Sanitation Company should provide awareness raising programs to the community about the dangers and consequences of inappropriate waste disposal, and should work on improving the status and conditions of waste disposal workers, and increase the participation of NGOs and CBOs. The researcher also recommends more studies should be done on a larger scale with a wider scope town with more variables and dimensions and with more experimental methodologies.

Kelvin and Jane (2015) in their paper called "Determinants of effective solid waste management for KAKAMEGA COUNTY" assessed the determinants of effective solid waste management in Kakamega County, because of its increasing sites of unattended waste disposal in public spaces. The objective of the study was; to establish the extent to which technical factor, financial factor and institutional factor influence effective solid waste management in Kakamega County. They selected 62 employees of Kakamega County as a target population; with allocation of 40 employs from the ministry of Health and Sanitation, 16 employs from ministry of a housing and 4 officials from National Environmental Management Authority via stratified sampling. Data collection instruments for this research were questionnaires and interviews.

The study found out that financial factors played a factor in effective solid waste management in Kakamega County, whereas technical factors such as lack of professional personnel and equipment had an association to effective solid waste management and institutional factors (such as county lack of public awareness and policy on waste reduction, lack of clear authority and sanitation rules) significantly influenced effective solid waste management. Based on those findings, they prescribed that for the improvement of effective solid waste management in Kakamega County, strict enforcement of by-laws and policy, more budget allocation and proper waste allocation systems are needed.

Hayal Desta et al.(2014), wrote a paper titled with "Assessment of the contemporary municipal solid waste management in urban environment: The Case of Addis Ababa, Ethiopia", with the objective of evaluating the existing municipal solid waste management (MSWM) practices in Addis Ababa.

The authors marked that huge generation of Municipal Solid Waste(MSW) coupled with unbalanced waste management services is the major challenges facing the City of Addis Ababa.

Both primary and secondary sources were used. Their findings showed that the daily generation of solid waste is estimated to be 0.5 kg per capita per day and the density of solid waste ranges from 205 to 370 kg meter cube. More, the result showed that there are some generic factors namely: lack of sufficient budget, inadequate and malfunctioning operation equipment, illegal dumping on undesignated sites, open disposals, poor condition of the final dump site, lack of effective public participation and in adequate governance in waste management system, contributing to the poor management of solid waste in Addis Ababa. They indicated that early involvement of representatives from all concerned stakeholders in the planning process and continuous awareness are critical elements of successful solid waste management programs.

2.5 Literature gaps

In general, the available literature on solid waste management has widely been conducted by Addis Ababa city administration, local NGOs and students preparing Master's thesis but the studies are limited in number as compared to the immensity of the problem. It is possible to identify three main areas of interests that dominate the studies:

Firstly, importance of private sector involvement for better management and on the relevance organizing informal recycling system (Edmealem Bewketu,2013, Aklilu Amiga, 2002, ENDA Ethiopia, 1999). The finding was the involvement of private sector can contribute to waste management and recommended as a means for suitable waste management but it did not study how they can be successful.

Secondly, estimating the amount of waste (Aklilu Amiga, 2002),remarked that there is unbalanced weight between the growth of waste and capacity of collection and transportation and sanitary site for disposal. The exponential growth calls for change in practice.

Thirdly, focuses on developing of the new sanitary landfill and transfer stations (Escalante, 2002; Tadesse Kuma, 2004).

However, in the newly integrated solid waste management system effective SWM practice still largely depend on the establishment of the good working environment for private involvers . In fact, related previous studies on solid waste management practice in Addis

Ababa did not explore such important factors . Therefore, it is imperative to study the factors which influence the sustainable waste management capacity of private firms.

2.6 Conceptual framework

The conceptual framework depicted in Figure 1 illustrates the relationship between influencing factors and effective SWM practice. Influencing factors were as financial, technical aspects, institutional, social and political aspects, and effective SWM practice (collection, transport, and disposal). Financial resources was (financial cost , operating cost, , and cost recovery and investment on capital) while technical aspects was modern vehicle and equipments, skilled personnel for waste collection, transfer, and waste disposal. Social condition were as conditions of the workers, beneficiaries attitude and awareness rising. Institutional aspects were conceptualized as integrated SWM, proper institutional framework, and elongated contract. The framework postulates that the status of financial, technical , and institutional, social and political condition directly influence the collection, transportation and disposal. After the literature ,the study guided by the framework below in the figure 1
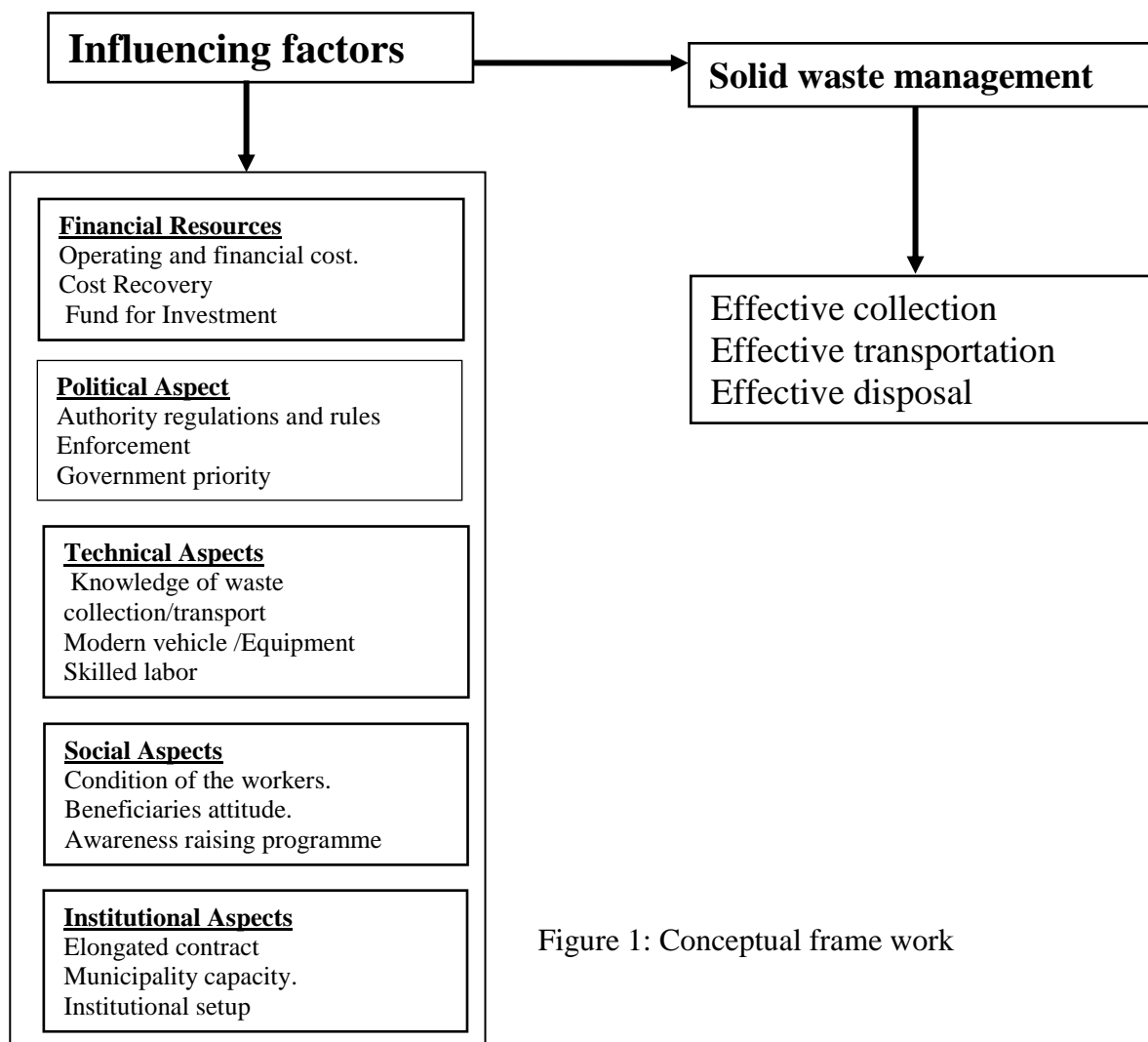
Figure 1: Conceptual frame work

CHAPTER THREE

3. THE REASERCH METHODOLOGY

As indicated in the literature section, there are theories on solid waste management and several studies were made to assess the effectiveness of solid waste management with different methodologies. This chapter examines the effectiveness solid waste management practices and influencing factors correlates in Addis Ababa using selected methods.

3.1 Research design

To obtain the information properly, the study has adopted a descriptive research design.

Descriptive : It is suitable for describing the existing situation (present situation) narrating facts and investigating phenomena in their natural setting (Koul, 1997). Thus, descriptive survey approach was employed in the study. It was used to describe analysis and interpret the nature of the problem under study based on the data collected from both primary and secondary sources.

3.2. Research approaches

Research approaches are mechanisms of attaining research objectives. The approaches are adopted to achieve the best possible to the research objectives. The common research approaches used are quantitative, qualitative and combing the two (mixed research approaches).

3.2.1 Mixed approach

A mixed approach is one in which the researcher tends to base knowledge claims on pragmatic grounds (e.g., consequence-oriented, problem-centered, and pluralistic). It employs strategies of

inquiry that involve collecting data either simultaneously or sequentially to best understand research problem (Cresswell, 2009).

The data collection also involves gathering both numeric information (e.g., on instruments) as well as text information (e.g., on interviews) so that the final database represents both quantitative and qualitative information. The advantage of a quantitative research approach may be limitations for a qualitative approach and vice versa.

Many scholars have brought forward the idea of combining qualitative and quantitative approaches (e.g. Bryman, 2009 and Creswell, 2009). The objective of combining the two approaches is to preserve the strengths and reduce the weaknesses in both approaches. The preferred term for combining these approaches is "mixed methods" (Bryman, 2009).

Therefore, this study has adopted mixed approach in order to manage a broader and more complete range of research questions, to provide stronger evidence for a conclusion through convergence and corroboration of findings, to triangulate and the researcher's claim for validity of conclusions are enhanced if they could be shown to provide mutual confirmation (Bryman, 1988).

3.3. Population and sampling technique

According to Creswell (2003) , the sample shouldn't be too large to be economical and shouldn't be too small to keep the validity of findings. Accordingly this study used two sampling stages. The first one is to sample out the Private waste managing companies and secondly the number of respondents within the company. According to waste management agency, there are 27 private companies engaged on waste management from Institutions and Commercial companies in Addis Ababa. From the existing 27 companies three were selected for their convenience to collect data about the effectiveness current SWM practice and its influencing factors.

The criteria used for selection: Service year and coverage (size). The larger the service year and size of coverage assumed the more the variety of the challenges. The names of the private companies under waste management practice are Rose private limited company, Dynamic private limited company and Yes private limited company. It was convenient for the researcher to gather reliable and sufficient data from these companies. In regard to a number of

respondents, there was a total of 176 population (employees) on the surveyed companies. From this total population, 121 employees were selected at 5% margin of error by setting response distribution 50% with 95% confidence level. Setting the response distribution to 50% is the most conservative assumption which gives largest sample size .(Bartlett, Kotrik and Higgins, 2001) . Then proportion number of employees were selected using stratified sampling by dividing in to two strata . The first strata contain waste collectors and drivers and the second strata contains administrative workers .

From each strata employees were selected using simple random sampling. This often improves the representativeness of the sample by reducing sampling error (Bartlett et al., 2010)
In this manner (57%) of the employees were selected from Rose Private limited company, (34%) from Dynamic Private Limited company and (9%) from Yes Private Limited Company . At this stage respondents were selected randomly because of their similar nature . Furthermore, Interview was conducted with (2) key informants from each companies and (3) from waste management agency . The criteria used to select the interviewee was based on their length of exposure on the solid waste management work.

Table 3.1: Summary of sampling population

Company name	Unit of Analysis (Population Group	Population size	Sampling size	Sampling methods
Rose Private limited company	Administrative(management) staff	15	10	Simple random
	Collectors and drivers	85	59	Simple random
Dynamic private limited company	Administrative(management) staff	7	5	Simple random
	Collectors and drivers	53	36	Simple random
Yes private limited company	Administrative(management) staff	3	2	Simple random
	Collectors and drivers	13	9	Simple random
		176	121	

3.4 Source of data collection

Data were collected from both primary and secondary source. The primary data were collected from formal and informal survey. The formal survey was carried using questionnaire, schedule for interview from employees of three conveniently selected solid waste service delivering private firms and Addis Ababa waste Cleaning Agency where as the informal survey was undertaken through personal observation in the area. Secondary data was also another important source of information for the study. The secondary data for this research was gathered from related published and unpublished materials, books, journals, manuals, various research papers and government publications which were found in the library, website and report from the environmental protection agency.

3.5 Methods of data collection

3.5.1 Data collection procedure

To collect data on the existing SWM practice and its s influencing factors , the researcher followed the following stapes;

Firstly, scheduled preliminary interview was conducted with key informants from Addis Ababa solid waste agency. At this stage the researcher was informed about the existing waste management structure and main involvers. The list of private limited waste collectors , their service year, coverage and address were known.

Next, the researcher selected three companies based on their convenience to collect the relevant data to conduct the research. The criteria used were service year and size or coverage, the longest the service year and the largest the coverage were assumed the highest exposure for many challenges or influencing factors. After companies selection the researcher scheduled for preliminary interview. The researcher was also distributing 10 questioner while he conduct the interview by asking the key informants consent in order to check the data reliability.
 By taking all the comments and corrections , the English language version questioners was translated in to Amharic language for easy communication to collect important data.

Finally, 121 questionnaires were distributed and collected with the help of field assistants.

In terms of response, out of 121 questionnaires that were distributed, 108 (89%) were filled and returned.

In addition to this relevant and accurate information were collected from selected informants of the Cleaning Agency through interview. Regarding the secondary data relevant published and unpublished documents were reviewed.

3.5.2 Survey instrument

The researcher used three basic instruments in the process of collecting necessary data for the study namely: questionnaire, interview and field observation.

3.5.3 Questioner

In order to carry out the data collection the researcher employed a questionnaire as the major tool. The questionnaires were composed of closed and open ended questions which were distributed to 121 respondents. The survey instrument contains both open and closed ended questions. The open ended question gives the respondent freedom to indicate the area not mentioned in the close ended questionnaire. The close ended questionnaires are developed in two sections. The first one is on the general aspect of the respondent and the second one is developed based on waste management. The first section is aimed to evaluate whether the status and education leveled of the respondents has an influence on waste management. The second section is used to evaluate respondent's opinion about the current solid waste management practice. The questionnaires were translated from English language to Amharic Language with the guide of language professional. This method was chosen for its flexibility and understanding for respondents. This instrument monitored through personal visits by the researcher and by the co- operation of supervisors from each companies.

3.5.4 Interview

Interview was conducted for the intention of gathering information with the manager of private waste collectors, and Cleaning Agency because it is an appropriate tool for the researcher to get responses given as well as to develop follow up questions to gain deeper insights in to the concerns of official. Interview schedule is selected because of its advantages like chance of obtaining in depth data related to the problems.

3.5.5 Observation

The observation method is the most commonly used technique in collecting primary data. The main advantage of this method is that subjective bias is eliminated and the information obtained under this method relates to what is currently happening; it is not complicated by either the past behavior or future intentions (Kothari., 2004). It was employed to observe solid waste management practices at the private collector's level in the city. It is not about what people have written or what they say, but it is what they do.

3.3.4 Methods of data analysis techniques

Data collected from three selected institutional firms over 108 respondents have been analyzed using SPSS (version 19) by applying descriptive statistics (mean, standard deviations ,frequency and percentage). Correlation has also used to assess the relationship between influencing factors (indicator) and SWM practice

3.3.5 Validity and reliability test of instrument

One of the common methods to test the reliability and validity of data collected through questionnaire is use of Cronbach's alpha coefficient. Lee Cronbach (1951) defines reliability as an attribute of an instrument used to measure consistency. Consistency indicates that an instrument has constructive value it used to measure. A commonly accepted rule of thumb for describing internal consistency using Cronbach's alpha on the(Appendix D) . Therefore, the Cronbach's alpha for this study collected from 10 randomly selected respondents for the 37 items included in this study is 0.84.

This shows that the Cronbach's alpha lies within the $0.8 \leq \alpha \leq 0.9$ category indicating that the survey instrument was good in terms of internal consistency
To achieve the validity of data, the study identifies the indicators to be measured with consultations of the advisor. The validity of the research was assured through designing appropriate questions for interviews and questionnaires by adapting different guide lines and past literatures . Example guide line by (WHO ,1992 ; Cointreou, 1982 ; Hufane ,2015 and Edmealm Bewuket,2013)

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3.3.6 Variables and indicators

One of the reasons for the conduct of this research is to examine factors influencing solid waste management practice by private firms in Addis Ababa. As indicated in the literature section an effective solid waste management practice measured were effectiveness of collection, transportation, and disposal whereas factors influencing effective solid waste management practice were financial constraints, technical aspects, institutional aspects, social and political conditions. In order to identify these factors, respondents were asked 42 question for these all factors). Response from negative statements (indicators) were recorded as positive on the coding process (Bredl & Higgins , 1996)

The recoded responses were question No (4.1,4.2,4.4,4.5,7.4,7.5,8.1,8.2,8.3 & 8.5) see (Appendix A)

In both ways of evaluating the effectiveness of solid waste management and influencing factors in the data interpretation is based on the reply by the respondents on their degree of agreement or disagreement with each of the questions on a five-point Likert response scale (Likert, 1932) that ranged from 5 "strongly agree (scored as 5) to "strongly disagree" (scored as 1). The expected mean for an effective solid waste management component is 5 or close to 5. However, the analysis is based on how the mean response of the respondents is close to this expected value. For all questions a positive mean response more than 3 statistically suggests agreement with the statement/question, a positive mean response less than 3 implies disagreement and a mean response close to 3 indicates indifferent or offsetting differences.

Researchers use this methodology, because it is relatively easy for respondents to use, and responses from such a scale are likely to be reliable (Fianko, 2015).

CHAPTER FOUR

4. Data result and discussions

This part dealt with data results; summarized along with its interpretation followed by analysis.

4.1 Data Result Interpretation

Survey questionnaires collected from over 108 respondents have been summarized in tabulation form.

4.1.1 Respondent profile

It is necessary to analyze some demographic and job characteristics of the respondents to see the extent to which samples were representative of the population from which they were drawn and also because variation in such characteristics may influence relationships between indicators variously.

Demographically sex, age and educational characteristics of respondents were considered.

In terms of sex, Table 4.1 shows that only 14.8% of the respondents were females while the male respondents were 85.2%. Though the ratio is not proportional both category of the respondents were participated.

Table 4.1 Sex category of respondents

Gender	Frequency	Percent
Female	16	14.8
Male	92	85.2

Own survey,2016

Table 4.2 Age category of respondent

	Frequency	Percent
18 to 25	51	47.2
26 to 35	45	41.7
36 to 45	9	8.3
Above 45	3	2.8
	108	100.0

Own computation, 2016

In terms of what we call age characteristics, Table 4.2 illustrates 47.2% of the respondents were between the ages of 18 to 25; 41.17% of them are between 26 to 35; 8.3% between 36 to 45; and the remaining 2.8% were above 45.

The other influentially relevant demographic characteristics here is education, because a level of education tends to influence the performance of employees in all fields, and could much significantly influence the performance of SWM sector in the research area.

Table 4.3 Education level of respondents

	Education level	Frequency	Percent	
Valid	Primary school	20	18.5	
	Secondary school	54	50	
	Vocational Level	7	6.5	
	Diploma	12	11.1	
	BA degree	8	7.4	
	Masters Degree & above	1	.9	
	Illiterate	6	5.6	
		108	100	

Own survey, 2016

As one of the demographic characteristics, the respondents were also asked to indicate their level of education. Education was a relevant demographic issue here, because the level of education tends to influence the performance of employees in all spheres, and could influence the performance of SWM discussed in the research. Table 4.3 shows the distribution of

respondents by their level of education. It shows that majority (50%) of the respondents had completed secondary education; while 18.5% had primary education; the other 11.1% of the respondents had diploma; 7.4 % of the employees had BA degree education and 0.9% of the respondent had Masters Education. On the other hand 6.5% of the respondents were illiterates. This leads to the fact illustration that most of the respondents have secondary education background. Therefore, this educational distribution of employees leads us to the realistic conclusion that it has been carrying out the operation in the capacities of management and technical work required in SWM of the city sufficiently.

Table 4.4 Position or rank of employees

	Position (work assigned)	Frequency	Percent
	Administrator	16	14.8
	Collector	62	57.4
Valid	Driver	21	19.4
	Others	9	8.3
	Total	108	100

Own survey, 2016

The respondents were also asked to indicate their rank or position in order to consider the job characteristics The information on rank was necessary to determine if all employees were effectively represented in the sample regards position wise.

Table 4.4 shows the distribution of respondents according to the position they hold in the job. It shows that majorities (57.4%) of the respondents were waste collectors; 19.4% were drivers, 14.8 administrators and the remaining 8.3% were assigned in other auxiliary works. Therefore, g reat numbers of employees need to engage to the duty of garbage collection, since SWM is more of a menial job and does not require many highly skilled persons.

4. 1.3 Existing solid waste management practice

One of the parameters used in assessing a performance of a waste service delivery is its effectiveness. Effectiveness of a firms waste service delivery practice can be assessed using indicators such as waste reliable collection, transportation and disposal. The present study employs these indicators to assess effectiveness of waste service delivery by selected private firms in Addis Ababa.

4.1.3.1 Waste collection

A given waste management practice is considered to be effective when a waste collection goals are achieved. An effective waste collection can be recorded when companies are able to facilitate enough collection points near to all beneficiaries, increase a frequency of waste pick up, avoid waste spill over and when waste personnel is fully and frequently trained

Table 4.5 Solid waste Collection Practices
        N=108

Indicators	Mean	S.D	SA	A	U	D	SD
Frequency of waste pick-up are strictly followed by our company	3.26	1.179	14(13%)	45(41.7%)	9(8.3%)	35(32.4%)	5(4.6%)
There is full and continuous training on solid waste collection in our company	2.74	1.155	11(10.2%)	17(15.7%)	24(22.2%)	45(41.7%)	11(10.2%)
Our company have facilitated enough number of collection points near to all beneficiaries	3.04	1.067	11(10.2%)	25(23.1%)	34(31.5%)	33(30.6%)	5(4.6)
The waste spillover our Company maintains to the ground is cleaned at collection	2.25	1.208	8(7.4%)	14(13%)	5(4.6%)	51(47.2%	30(27.2%)

Own survey, 2016

SA: Strongly Agree, A: Agree, U: undecided, D: Disagree, SD: Strongly Disagree

In table 4.5 the study illustrates the indicator category (Frequency of waste pick-up are strictly followed by our company), has scored the highest mean of 3.26 above 3. In frequency terms, 59

of the respondents out of 108 are in favor of the indicator regarded as frequency of waste pick-up are strictly followed by our company showing their agreement and strong agreement (depicted as agree and strongly agree); whereas 40 respondents disfavored the indicator declaring their position as disagreed and strongly disagreed, and the rest has not then decided and grouped under undecided. This illustrates the control of waste picks up as viewed by the respondents is in good condition.

When we look at the second factor which is focused at training has faced major resistance for 46 of those who responded generally disagreed with it. Therefore, solid waste collection training in the selected companies were at its low level.

The proximity of enough collection points to the beneficiaries is undecided to the respondents who made their attitude clear, having the 38 disagree and strongly disagree and 36 of them having categorized their position under agree and disagree and the rest have not declared their view on this point. The mean figure also indicated 3.04 which is near to undecided by the respondents.

On the other hand, the respondent opinion on the indicator (The waste spillover our Company maintains to the ground is cleaned at collection), has ranked as disagree with the least mean of 2.25. The highest standard deviation of 1.208 indicated that points are spread out over a wider range of values. In percentiles, 74 percent of the respondent opinion was as disagreed or strongly disagreed, the remaining 4.8 percent as 'neutral ' and only 20.4 percent as agreed or 'strongly agreed'. The observation by the researcher also indicated this fact on the appendix photo 3 & 4.

This information indicates the commitment of the waste management companies to get the waste spillover on the ground cleared is weak.

In summary, the entire mean figure on the indicators of current solid waste collection practice (2.82) below mean figure 3 indicates the poor status of current solid waste management practice.

4.1.3.2. Solid waste transportation practices

Under the framework of effective solid waste management, safe and reliable transportation was considered as one of the key measurement for effective SWM (Hufane, 2015). Subsequently, effective solid transportation can be achieved by companies with sufficient manpower and modern vehicle, nature of available roads, traffic condition and traveling Schedule (Shubeler, 1996)

Table 4.6 Solid Waste Transportation

N=108

Indicators	Mean	St.D	SA	A	U	D	SD
Our company have sufficient manpower and vehicle to transport solid waste	2.66	1.087	6(5.6%)	26(24.1%)	8(7.4%)	61(56.5%)	7(6.5%)
Nature of traffic condition along collection route has created jamming	2.74	1.370	18(16.7%)	18(16.7%)	8(7.4%)	46(42.6%)	18(16.7%)
Our company supervises the daily number of trips, tonnage of waste and route plan to drivers	3.94	.863	26(24.1%)	61(56.5%)	10(9.3%)	11(10.2%)	0
Our company use covered vehicles and there is no spillover of solid waste upon transport	2.54	1.256	8(7.4%)	26(24.5%)	3(2.8%)	50(46.3%	21(19.4%)
The existence of inadequate internal roads (alternative roads has created challenges on solid waste transportation.	2.42	1.224	10(9.3%)	16(14.8%)	4(3.7%)	57(52.8%)	21(19.4%)

Own survey, 2016
SA : Strongly Agree ,A: Agree , U : undecided , D: Disagree, SD: Strongly Disagree

The result of the survey indicated in the above table 4.6 shows that opinion of respondents on the current solid waste transportation. On the indicator (Our company has sufficient manpower and vehicle to transport solid waste) respondents expressed their views with (mean =2.66) which implied the response of respondents below the likert scale mean of 3. In percentile terms, a significant number of the respondents (63%) from the total expressed their opinion with disagreement and the remaining 37 percent positioned themselves agreed, strongly agreed and neutral. This result indicates that the current solid waste transportation system is hindered by manpower and vehicles. Furthermore, an observation made and interview conducted by the

researcher confirmed that the available manpower and vehicles found in each company under the survey varies widely and they are in shortage.

The Nature of traffic condition along collection route is disapproved by 64 respondents outweighing the approval of the 36 and the undecided 8 having mean figure at 2.74

Supervision of the daily number of trips, tonnage of waste and route plan to drivers by the company won massive support from 87 respondents out of 108, generally disagreements stood at 11, and 10 have nothing to say having the highest mean of 3.94 and leas standard deviation of .863

It is also noted that in question which is on the positively recorded indicator, on the existence of alternative internal roads for the effective solid waste transport system. Respondents recorded their belief with the least mean value of 2.42. In percentiles, 59.3 percent strongly disagreed or disagreed while 33.4 percent strongly agree or agree and the remaining 7.4 percent remains neutral. This indicates that traffic condition and alternative roads has negatively influenced the transportation system of solid waste management. The entire mean result of 2.86 below the likert mean of 3 indicated respondents opinion on the current ineffective solid waste transportation practice.

4.1.3.3 Solid Waste disposal

Waste management is also dependent on safe and reliable disposal system. This system can be effectively achieved when disposal site is on accessible landfill near to collection points, closed and protected from animals and which has no bad smell to the community.

Table 4.7 Solid Waste Disposal Practice

N=108

Indicators	Mean	S.D	SA	A	U	D	SD
The existing disposal site is far-away from our collection point	2.36	.952	2(1.9%)	16(14.8%)	15(13.9%)	61(56.5%)	14(13%)
Municipality did not provide designated and accessible land fill site	2.34	1.112	3(2.8%)	14(13%)	31(28.7%)	29(26.9%)	31(28.7%)
The existing disposal site is open and it has irritant(bad smell) to the community	2.77	1.425	17(15.7%)	26(24.1%)	2(1.9%)	41(38%)	22(20.4%)
Our company disposes waste at designated land fill by law and it is environmentally safe	3.23	.882	2(1.9%)	48(44.4%)	34(31.5%)	21(19.4%	3(2.8%)
Presence of animal on the existing disposal site is common.	3.2	.935	8(7.4%)	25(23.1%)	54(50%)	17(15.7%)	4(3.7%)

Own survey ,2016

SA : Strongly Agree ,A: Agree , U : undecided , D: Disagree, SD: Strongly Disagree

In table 4.7 respondents were asked whether effective solid waste disposal system is practiced or not using five indicators with Likert scale and all responses were recorded from negative to positive. Except for the indicator (Our company disposes waste at designated land fill by law and it is environmentally safe)

Respondents were asked the question of whether the existing disposal site is far away from the collection point, and their opinion was on the position of mean = 2.36 and 69.5 percent were strongly disagreed and disagreed ,16.7 percent strongly agreed and agreed while the remaining 13.9 percent of the respondents were undecided. Similarly, the indicator (municipality did not provide designated and accessible landfill site), was defied by 60 respondent outweighing the 17 approvals as agreed with the lowest mean value of 2.34 and indicate this practice is weak.

Waste management is achieved when landfill site is well closed and bad smell is managed. The response scored was mean value of 2.77 which are 58.4 percent strongly agreed or agreed while 39.8 percent strongly disagree or disagree and the remaining 1.9 percent was undecided. The above table further indicates that respondents opinion on indicator (companies dispose waste at designated landfill by law and it is environmentally safe) , was attained mean value = 3.23; which means 46.3 percent strongly agreed and agreed , 22.2% strongly disagreed and disagreed

and the remaining 31.5 percent remain undecided. This indicates respondents opinion has distortion about their company's waste disposal place. Similarly, respondents view on the indicator (presence of the animal on the existing disposal site is common) was ranked a mean value of 3.2. Finally, the grand mean value for the set of solid waste transportation practice indicators scored by respondents was 2.78 which indicated the poor practice of current solid waste transportation.

4.1.4 Factors influencing the effectiveness of SWM practice

4.1.4.1 Financial constraint and Solid Waste Management

Financial resources were conceptualized in terms of four dimensions: financial cost and operating cost, cost recovery and capital for investment. Respondents were asked to rate, using a five point likert scale, several statements related to these indicators with the view to assessing the financial conditions of the firms.

Table 4.8 Financial conditions of SWM   N=108

Indicators	Mean	S.D	SA	A	U	D	SD
There is adequate revenue generation ,for provision of effective Solid waste management within our company	2.36	.952	2(1.9%)	16(14.8%)	15(13.9%)	61(56.5%)	14(13%)
Our vehicle always have fuel and ready for use all the time	2.44	1.079	3(2.8%)	14(13%)	36(33.3%)	29(26.9%)	26(24.1%)
Working on the solid waste collection and transportation business service is attractive	3.14	1.027	15(13.9%)	18(16.7%)	44(40.7%)	29(26.9%)	2(1.9%)
Our company is receiving (collecting) fair fee for its solid waste management service	2.31	.971	3(2.8%)	16(14.8%)	6(5.6%)	69(63.9%)	14(13%)
There is sufficient money for the promotion of waste reduction, recycling and recovery programs	2.25	1.208	3(2.8%)	16(14.8%)	6(5.6%)	69(63.9%)	14(13%)

Own survey,2016
SA : Strongly Agree ,A: Agree , U : undecided , D: Disagree, SD: Strongly Disagree

As showed in table 4.8, (there is adequate revenue generation for the provision of effective solid waste management within our company) was scored as disagreed with mean value of 2.36 below 3. Again, more than half of the respondents (56.5%) responded that they disagreed with the existence of adequate revenue generation in their respective companies for effective solid waste disposal, as opposed to only (17%) of respondents saying that there exists (agreed and strongly agreed in total). This has an indication that there is no adequate revenue generation so that solid waste disposal service is not provided effectively.

Next, (our vehicle always have fuel and ready for use all the time) was scored as disagreed again with mean value of 2.44 . The numbers of respondents that answer disagreement over the statement are 29 out of 108, with other 26 people showing strong disagreement. That means in aggregate (51%) believed that vehicles are not always ready for use with adequate fuel. Here the number of respondents who have the neutral view is not insignificant, (75%) of the total respondents are not able to rule out vehicles being ready with required fuel or not, they have not decided either agreement or disagreement. This implies that respondents were not sure whether vehicles have been ready and with sufficient fuels. If firms had been generating adequate revenues, the respondents would have been certain about vehicles always readiness and with sufficient fuels.

This was consistent with the observations and interview made with key informants about waste management practice.

Thirdly, (working on the solid waste collection and transportation business service is attractive) was scored as almost undecided with a median value of 3.14 . The respondent who has answered that they have the neutral view on the statement are (40%) of the total, followed by those who said agreed (about 27%) and disagreed (about 17%). More precisely, people who responded agreed (including strongly agreed) constitute (30%) of the sample with 28.8% responding disagreement (including strongly disagreed).

On the indicator of financial condition (our company is receiving a fair fee for its solid waste management service) was scored as disagreed with median being 2.35. In percentage terms, this group constitutes about (65%) of the total respondents and the percentage grows to 77% when those who said strongly disagreed are included. This means that 75 percent of the respondents deemed that their respective companies are not receiving the fair amount of fee for their solid waste disposal services while about (18 %) saying their companies getting what they should with 5% having the neutral view. According to the interviewee from private waste

collecting companies, the current payment for their service is said to be unfair due to the additional cost of transportation fuel to reach at the newly assigned disposal site at Sendafa. On the other hand, the agency's measurement change from meter cube to Kilogram has cut their income drastically. On the old measurement, they were paid Birr 74 /m3 but on the new measurement 1m3=330Kg .That means they have to collect 330Kg solid waste for Birr 90. It is also noted that the major waste from institutions and commercial organizations characterized by low weight since most of it contains plastic and paper. According to the key informant from Rose private limited company, their income will be decline by 60% if the agency continued by this decision. Finally, all the companies disclosed that they are collecting waste for six months without payment and if the problem cant corrected they will quite the service.

Then, the implication is that companies are not paid the fair fee for their solid waste management service.

Lastly, on the indicator whether (there is sufficient money for the promotion of waste reduction, recycling and recovery programs) was scored as disagreed with a mean value of 2.25, people who disagreed constitute about 65 percent (the share becomes 76 if those who strongly disagreed are included), followed by group of people who answered agreed (constituting about 15%). This indicated that there has not been sufficient money for the promotion of waste reduction, recycling and recovery programs. While it was discovered that most wastes have been disposed but not converted to generate energy and other important waste recycle products which can be sold at a profit. The entire or grand mean in table 4.8 scored was 2.5 which indicated respondents opinion on constraints of financial resource. From the above indicators we can observed that solid waste management practice is highly influenced by financial constraints.

4.1.4.2 Technical constraints and solid waste management

The researcher developed criteria/indicators to assess the status of technical condition of private waste collectors. These are adequate and modern waste management equipments, environmentally adaptable and maintainable equipments with sufficient spare parts, good infrastructure to collect and transport with skilled personnel.

Table 4.9 Technical conditions of SWM firms

Indicators	Mean	St.D	SA	A	U	D	SD
Our company has adequate and modern waste management equipment	2.27	.963	3(2.8%)	15(13.9%)	5(4.6%)	70(64.8%)	15(13.9%)
Our company usually uses environmentally adaptable and maintainable equipments	2.33	.947	2(1.9%)	13(12%)	21(19.4%)	55(50.9%)	17(15.8%)
Addis Ababa city is well planned with appropriate infrastructure to collect and transport waste	2.31	.912	1(.9%)	19(17.6%)	3(2.8%)	74(68.5%)	11(10.2%)
Waste personnel in our company are regularly getting training	2.06	1.126	3(2.8%)	16(14.8%)	5(4.6%)	44(40.7%)	40(37%)
There are accessible spare parts when vehicles and equipment s are breakdown.	2.32	1.031	7(6.5%)	9(8.3%)	11(10.2%)	66(61.1%	15(13.9%)

Own survey,2016
SA : Strongly Agree ,A: Agree , U : undecided , D: Disagree, SD: Strongly Disagree

As presented in table 4.9, all of the five indicators were scored as disagreed with mean figure below 3. In percentage terms, on the first technical condition indicator (78.7%) of the respondents answered companies have adequate and modern waste management equipment with disagreed and strongly disagreed but (17%) being agreed with the statement (including strong agreement) and the remaining (5%) answered 'neutral'. This indicates that most of the companies are unable to have adequate and modern waste management equipment according to the respondents. Next, on the indicator (our company usually uses environmentally adaptable and maintainable equipment), (66.7%) expressed their view as disagreement (including strong disagreement), (13.9%) strongly agreed and agreed while one-fifth (19.4%) remain neutral. As the majority answered disagreement and above (66.7%) it seems to reveal that companies have weakness on using maintainable and environmentally adaptable vehicles and equipment.

Most of the respondents rated the indicator (Addis Ababa city is well planned with appropriate infrastructure to collect and transport solid waste), as disagreement (including strong disagreement) (that is about 80%). That means the remaining respondents (strongly agreed, agreed and neutral). Constitute only one-fifth of the total. All this indicates that we can

conclude that Addis Ababa city is not generally well planned with appropriate infrastructure for solid waste collection and transportation.

Respondents on indicator (waste personnel in our company are regularly getting training) said (by about 78%) they strongly disagreed or disagreed with the statement. Whereas 18% of respondents said they strongly agreed and agreed with only (5%) remaining neutral. On average with the least mean response value of 2.06 and highest standard deviations , this means that employees who are involved in the waste management work have not got continuous training on how to work with and manage solid waste. Finally, (75%) of the respondents strongly disagreed and disagreed on the indicator (there are accessible spare parts when vehicles and equipment are broken or damaged). While the rest constitute 25 percent (strongly disagreed, disagreed and neutral). Waste management is risky business since all the vehicles are imported their maintenance is problematic and sometimes they have no spare part and finding skilled personnel to operate them is another challenge.

Accordingly, we learned that at times when vehicles and equipment used for waste disposal are damaged, spare parts and other maintenance accessories are not available in Addis Ababa city in most of the companies.

In summary, the respondents mark all (sub) indicators that makes technical aspect indicator disagreed as the grand mean of these indicators are turned out to be equal to 2.25. In consequence, it evident that technical aspects pose serious challenge on waste disposal in Addis Ababa: lack of adequate modern waste disposal equipment, not frequent use of environmentally adaptable and maintainable equipment, the city itself not being well planned with appropriate infrastructure suitable for waste collection and transportation, most of the companies falling to give regular training to their employees and inaccessibility of spare parts for damaged and broken vehicles and equipment are more or less negatively influencing factors on the proper waste disposal practice.

4.1.4.3. Social factors and Solid waste management

Social conditions were constructed from 4 indicators: the condition of workers (fair remuneration and workers protection at work), the attitude of beneficiaries about waste disposal workers and awareness raising programs.

Table 4.10 Social condition of SWM firms

Indicators	Mean	St.Dv	SA	A	U	D	SD
I am paid adequate salary and sufficient additional benefits for my work at our company	2.42	1.185	5(4.6%)	13(12%)	11(10.2%)	66(61.1%)	13(12%)
Waste workers always wear safe and protective gloves and and clothes during their work at our company	3.31	.990	25(23.1%)	47(43.5%)	5(4.6%)	27(25%)	4(3.7%)
Beneficiaries have good attitude for waste workers	2.31	1.404	8(7.4%)	26(24.1%)	1(.9%)	30(27.8%)	42(38.9%)
Our company carries out awareness raising programs on general public health and management of waste	3.01	1.201	13(12%)	26(24.1%)	27(25%)	33(30.6%)	9(8.3%)

Own Survey, 2016

SA : Strongly Agree ,A: Agree , U : undecided , D: Disagree, SD: Strongly Disagree St D :Standard deviation

As indicated in the above table the mean value of the response computed on Likert scale indicated the central point where respondents 'opinion on the social factors on the solid waste management practice. Unlike the technical aspects indicators all of which having mean value of below 3, social aspects indicator do not have uniform mean value equal to below 3

Only, the indicator, (waste workers always wear safe and protective gloves and clothes during their work), was pointed as agreed by respondents with mean =3.31. In percentage terms, 66.6 percent of the respondents said strongly agreed and agreed where as 28.7 percent of them strongly disagreed and disagreed together, and the remaining 4.6 percent constituted by respondent that said neutral. In solid waste management practice workers who are directly working on the collection, transportation and disposal must wear the necessary materials for

their safety and then wellbeing. This means majority of the respondents agreed that the materials are in line with this theory.

The above table also indicated two areas where the social condition of the workers is low. The first figure with a mean = 2.34 indicates that respondents do not think they are getting fair compensation for their labor. The indicator (I am paid adequate salary and sufficient additional benefits for my work at our company) from the total 108 respondents , 79 are not satisfied due to low payment .

As for indicator, beneficiaries have good attitude for waste workers, 67 percent of the respondents recorded strongly disagreed and disagreed with 32 percent agreed and strongly agreed, and only 11 percent remained neutral.

Lastly, almost equal number of respondents disagree (including strongly disagreed ones) and agree (including strongly agreed ones) with the statement described about awareness raising programs. In percentage terms, they are about (36%) and (39%) respondents who said they agreed and disagreed with their respective companies carrying out awareness raising programs on general public health and management of waste, respectively. Those who have neutral view constitute also significant portion, amounting one fourth of total respondents answering and the mean figure 3.01 also indicated that respondents uncertainty about this indicator. Indeed, the interview with private waste collecting firm remarked that the general public lack awareness problems about solid waste management and the culture of managing waste at source are almost not working.

Generally, the entire mean of the social condition indictors with 2.76 below the likert mean value of 3 , frequency and interview conducted implies that social condition of the three companies under the study were at poor status.

4.1.4.4 Institutional weakness and Solid waste management practice

Institutional strength indicators were proper organizational set up for responsibility , integrated participation between private and public agencies , sufficient and consistent contract between service provider ,beneficiaries and the authority and waste managing company that is responsible to service reliability (Un-Habitat,2013)

Table 4.11 Institutional condition of SWM firms

Indicators	Mean	S.D	SA	A	U	D	SD
There is no proper institutional set-up for solid waste management service	2.16	1.201	6(5.6%)	12(11.1%)	15(13.9%)	35(32.4%)	40(37%)
Several institutions or agencies are not involved in SWM	2.54	.961	1(.9%)	26(24.1%)	10(9.3%)	64(59.3%)	7(6.5%)
We have sufficient and consistent waste management contract period with the municipality	2.25	1.208	8(7.4%)	14(13%)	5(4.6%)	51(47.2)	30(27.8%)
There is integrated solid waste management practice between private and public agencies	2.54	1.321	11(10.2%)	16(14.8%)	24(22.2%)	26(24.1%)	31(28.7)
Our company has faced frequent customer complaint about solid waste management on its assigned jurisdictions	3.26	1.179	14(13%)	45(41.7%)	9(8.3%)	35(32.4%)	5(4.6%)

Own Survey, 2016

SA : Strongly Agree ,A: Agree , U : undecided , D: Disagree, SD: Strongly Disagree

From table 4.11 responses for negative indicators were recorded to positive. Response for all indicators of institutional condition except on the statement (Our company has faced frequent customer complaint about solid waste management on its assigned jurisdictions) ,were recorded a mean value below 3. In percentiles for the indicator (there is proper institutional set up for waste management service), has the least mean value of 2.16 . In percentile , 69.4 percent strongly disagreed and agreed and the remaining constituted altogether by undecided, agreed and strongly agreed. Indicator (several institutions or agencies are not involved in solid waste management system), in percentage(65.8%) supported this statement, but (25%) disagreed and (8.7%) undecided.

On the other hand, respondents reaction on the indicator (there is integrated solid waste management practice between private and public agencies) was scored with mean value of 2.54 below 3 with the highest standard deviations of 1.321 . In percentiles, (52.8%) strongly disagreed and disagreed. But, (25%) said agreed and strongly agreed and the remaining (22.2%) 'undecided. Again indicator (we have sufficient and consistent waste management contract period with the municipality), (75%) expressed their view as strongly disagreed and disagreed

with (20%) strongly agreed and agreed and the remaining (5%) was undecided. This problem was backed by results of interviews of managers of private solid waste management firms. According to their response, the municipality is frequently changing its contract rules and policy without their involvement in the decision making. Finally, the indicator (our company has faced frequent customer complaint about solid waste management on its assigned jurisdictions), was scored as (55%) strongly agreed and agreed, (36%) as strongly disagreed and disagreed and the remaining (8.3%) as neural. This means on the positively coded responses, respondents' opinion was there were no frequent complaints on their service

4.1.4.5 Political condition and Solid waste management

Political situation can be evaluated using the indicators of existing relationship between local and central governments (the effective degree of decentralization, for example), the form and adequacy of law and policy making and priorities given about environment by politicians and administration all affect the character of management, governance and the type of SWM system which is possible and appropriate (Schubeler,1996)

Table 4.12 Political Condition of SWM firms

Indicators	Mean	St.D	SA	A	U	D	SD
There is adequate policies , laws that promote for effective SWM	3.76	.916	19(17.6%)	58(53.7%)	19(17.6%)	10(9.3%)	2(1.9%)
The assembly enforces to implement the existing solid waste management law	2.19	.716	0	5(4.6%)	25(23.1%)	64(59.3%)	14(13%)
The assembly is independent when it monitor solid waste management companies	2.64	.942	3(2.8%)	9(8.3%)	59(54.6%)	20(18.5%)	17(15.7%)
The government gives high priority to solid waste management	2.78	1.026	7(6.5%)	23(21.3%)	20(18.5%)	55(50.9%)	3(2.8%)

Own survey, 2016

SA : Strongly Agree ,A: Agree , U : undecided , D: Disagree, SD: Strongly Disagree

From table 4.12 , The indicator (there are adequate policies and laws that promote for effective SWM), was recorded as agreed by the respondents with the highest mean value 3.76. This can be supported in percentile terms (71.3%) strongly agreed and agreed whereas (11.2%) strongly disagreed and disagreed and the remaining (17.6%) remain neutral. This reflection has supported with the existing waste management policies and proclamations No.513/2007

 On the other hand ,indicator (The government gives high priority to solid waste management) was scored as disagreed by the respondents with mean value = 2.76. In percentiles, (53.7%) strongly agreed and agreed. But, (27.8%) strongly disagreed and disagreed and the remaining (18.5%) remain neutral. In addition to this respondents stated their opinion with a mean value = 2.19 on the indicator (The assembly enforcers to implement the existing solid waste management law). In percentiles, (72.3%) expressed their opinion strongly disagreed and disagreed. However, (28.1%) agreed and remained neutral. But, no respondent was rated as strongly agreed. The indicator (policies and laws are enforced independently by the waste management agency) , was pointed with mean value of 2.64. Which means respondents were feeling as this policies and laws are not enforced.
 The entire arguments about the condition of the political aspect of solid waste service delivering practice show a moderate influence with grand mean vale of 2.84.

4.1.5 Relationships between the influencing factors and SWM
4.1.5.1 Correlation analysis

Correlation measures relationships existing between indicators, and does not necessarily show causal connections. Spearman's correlation was used to analyze relationships between each set of several indicators attributes of SWM firm, taken together as influencing aspects: financial, technical, social, institutional and political factors or conditions and measures of solid waste management effectiveness. As indicators were measured in ordinal scale, a non-parametric correlation (Spearman's Vs Pearson's) was preferred (Corder and Foreman , 2009).
In addition to this, the sign of correlation coefficient determines whether the correlation is positive or negative . The magnitude of the correlation coefficient determines the degree of strength of the association. Though there is no commonly accepted standard for range of correlation coefficients Tukey , (2014) stated coefficient of correlation standards as

Weak correlation $0< |r| <.30$

Moderate   correlation $.30 < |r| < .70$

Strong correlation $|r| >.70$

Table 4.13   Correlations between SW Collection and influencing factors
(N=108)

		Financial condition	Technical condition	Social condition	Institutional condition	Political condition
Spearman's Collection Correlation Coefficient	1.000	.296	.348	.323	.337	.036
P. Value		0.002	0.000	0.001	0.000	.712

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

*. Correlation is significant at the 0.05 level (2-tailed).

As shown in table 4.13 above, there exists positive correlation between collection and all the influencing indicators, separately. That means when each of the variables increase effective SW collection also increases, with the coefficient magnitude, but it did not indicate causal relationships. More precisely, except financial condition indicator variable, which has relatively significant positive but weaker association with SW collection, the other indicators have significant moderate positive relation almost equal in magnitude, that is, around 0.3 on average.

Separately, a moderate significant positive correlation is exhibited between SW collection and technical condition (with 0.348 correlation coefficient) indicating that ineffective solid waste collection has positive moderate association with firms' technical advancement problems. The moderate positive correlation (with 0.337 correlation coefficient) between collection and institutional condition comes second. This indicated that ineffective solid waste management has relation with weak institutional set-up, meaning that when the institutional setup is better, then there a chance for effective SW collection to exist, saying nothing about which causes which. More, positive correlation between collection and social condition indicates that the ineffective solid waste collection is related to low level of social conditions.

Also significant positive correlation between financial condition and solid waste collection revealed that minimum volume cube of solid waste collection associated with city al located

sufficient budget for firms. This association of ineffective solid waste collection and varies indicators influencing indicators as a challenge or the high the constraint the high ineffective SWM was in line with finding is consistent with findings by Williams and Fianko (2014).

In general, correlation measurement indicated that constraints of technical aspects, institutional, social aspects and financial aspects have significant positive associated with ineffective solid waste collection. Indeed, the high the constraints or influences associated with high the ineffective .

Table 4.14 Correlations between SW transportation and influencing factors

N=108

	Transportation	Financial condition	Technical condition	Social condition	Institutional condition	Political condition
Spearman rho Transportation Correlation Coefficient	1.000	.510**	.307**	.429**	.401**	.131
P-Value		0.000	0.001	0.000	0.000	.178

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

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.14 indicated that positive correlation between transportation and indicators, effective solid waste collection associated to the sets of indicators as influencing factors of effective SWM.

Correlation coefficient between transportation and financial, social, institutional, technical and political conditions exhibited .510,.429,.401,.307 and .131 respectively and has a positive significant moderate linear relationship with transpiration at p-vale below 5% significant level. Whereas political conditions and transportation shows insignificant (p>.05) . This means there is no linear relationship between political condition and transportation.

Significant positive association at different level indicates that ineffective SWM practice has relation with influencing factors.

Table 4.15 Correlations between SW disposal and influencing factors of effective SWM
N=108

Spearman's rho	Disposal	Financial condition	Technical condition	Social Condition	Institutional condition	Political condition
Correlation Disposal Correlation Coefficient	1.000	.454**	.025	.314**	.046	-.039
P- Value		0.000	.795	0.001	.638	.685

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

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.15 also shows the correlation between disposal as set of indicators measurement and indicators defined as (financial, technical, social, institutional).

Correlation coefficient between disposal practice and financial and social conditions exhibited .454, and .314 respectively and has a significant moderate relationship with transportation at p-vale below 5% significant level ,whereas technical, institutional and political conditions has no significant relationship with disposal even at 10% significant level.

Individually, the highest positive correlation (r= 0.454) is recorded between effective solid waste disposal and financial conditions, showing effective solid waste disposal is associated with good financial resources.

4. 2 Discussion of the result

The broad objective of this study was examining solid waste delivery practice and factors influencing its effectiveness. The study used multiple sources of data and analysis such as the survey method (descriptive statistics and correlation); document review; and qualitative

interview. Combining these different methods, this section discusses results of the data analysis in the light of the main research questions set for investigation..

RQ1: What is the current solid waste service delivery practice in Addis Ababa?

According to the Addis Ababa cleaning agency (2016), currently, the volume of waste totals more than three million cubic meters per year with the prospect of increased by a constant 2.1 cubic meters per person annually. Households in Addis Ababa contribute 76 percent of the waste while; institutions of the capital contribute 18pc to this total. The current waste management has three routes.

 Solid Waste collection

The Municipality has responsibility and it spends large proportion of its budget on collection, transport, and disposal of solid waste services.

To improve the range of coverage and consistency of service, the Agency has established Sub-city and Woreda Cleansing branch offices and outsourced waste collection services. After the introduction of solid waste management proclamation no.513/2007, primary collection system is done by private companies, micro and small enterprises. Addis Ababa City is currently divided into 10 Sub-cities, 116 Woredas each contracted to different management firm responsible for collecting and disposing of solid waste. (CCA, 2015)

The collection of solid waste from these household has been delegated to 529 Small Scale Enterprises. The existing 27 private companies are responsible for collecting waste from institutions and commercial companies.

Currently, the type of contractual agreement is arranged in contract system, where the Lehulu Kifya agency collects the service fee with utility payments such as water and electricity bill that can be transferred to the cleaning agency. Then the cleaning agency pays to private solid waste managing firms by measuring the amount of collected waste (1-meter cube was Birr 74) . However, currently, the payment system is by kilogram (1 kilogram is Birr 90).

Despite this arrangement, only (65%) of the waste is collected and the rest simply disposed on illegal damps (AACA, 2016). According to informants, the introduction of new payment system

from January 2015 to now has to create dissatisfaction on the solid waste collectors'. As a result, there is unpleasant smelling everywhere in the city.

In general, respondent's information on the effectiveness of waste collection indicators from the survey, interview result with key informants and observation by the researcher supports this ineffectiveness current solid waste collection.

Accordingly, above 50 percent of the respondent's opinion reveal that there is a lack of training for solid waste collecting staff. A significant portion (74%) said there is waste spillover on the road and the ground which indicate a deficiency of current waste collection that needs improvements. Finally, respondents were unclear with a median distribution of 3.04 whether enough collection point is facilitated for beneficiaries or not). In summary, the entire mean figure on the indicators of current solid waste collection practice (2.82) below mean figure 3 , observation made by the researcher and interview conducted with the agency and managers of private waste collectors indicated that status of current solid waste management practice is at poor level and this has negative impact on the health and environment.

Solid waste transportation practice

Transportation of waste is carried out by City Administration and private sector vehicles. The existing reality in Addis Ababa where waste transporting tracks are not available to the level demanded and even some of the available trucks don't all fully perform.

In summary, the entire mean result of 2.86 below the likert mean of 3 indicated respondents opinion on the current ineffective solid waste transportation practice. The indicator whether (company has sufficient manpower and vehicle to transport solid waste) , was scored disagreed with significant number of respondents(63%), It provided an indication that the important indicators for effective solid waste transportation (manpower and vehicles) are the main deficiency to transport waste in their respective companies. This finding is in line with the theory of (Schubeler,1996), which states the lack of skilled and adequate manpower and vehicles were the hindering factors to transport solid waste. Hence, current solid waste transportation is less effective.

The respondent's opinion also indicates two major deficiencies on the solid waste transportation with mean score below 3 were infrastructure problems of the city that is characterized by traffic jamming and inadequate alternative roads. According to Tadesse kuma (2004), infrastructure problems like traffic condition and a problem of available roads were hindering factors to have quick solid waste transport .

On the other hand , the firms were rated by respondents as they have the good practice of supervision on the daily number of trips, the tonnage of waste and route plan to drivers.

In general, respondents view indicate that the current waste transportation system by the survey private companies as ineffective practice .

Solid waste Disposal System

According to Un-Habitat(2010), a final waste disposal site should be properly selected and fenced so as to protect the entrance of stray animals and to reduce the impact of waste on surrounding environments as the whole.

In Addis Ababa city ,there was one open dumpsite where all collected waste is disposed of. It has been established 47 years ago. The site is known as "Rappi" or "Koshe" which is South West part of the city Located 13 km away from the city center . The method of disposal was crude open dumping: hauling the wastes by truck, spreading and leveling by bulldozer and compacting by compactor or bulldozer. The disposal site was one of the identified challenges to the system. This problem has forced the agency to introduce new dumping site at 'Sendafa' which is much further away than old one at Repi. This new dumpsite also creates major incipience between the agency and waste collectors, and the surrounding community due to no or low compensation for negative externalities to community and additional distance to waste collectors said by key informant from waste collectors. The survey result from respondents also confirmed this fact. When we sum up about the current disposal practice indicators, 75 percent of the respondent says the existing disposal site is far- away from the collection point. This indicates a deficiency on the indicator (the agency did not provide designated and accessible landfill site) . It is also noted that respondents opinion on the indicator (The existing disposal site is open and it has irritant(bad smell) to the community), was argued about the existence of the problem.

Finally, results on the indicator (Our company disposes waste at designated landfill by law and it is environmentally safe) and (Presence of animal on the existing disposal site is common) , was pointed a similar mean near to 3 that indicates respondents were uncertain about where their companies dispose waste and the existence of animal on the current disposal site.

 The respondents view ,interview and observation concludes that the current disposal site needs improvement.

RQ2: Which factors are influencing effectiveness of solid waste management practice by private firms in Addis Ababa ?

Financial factors and effective solid waste management practice

The survey result indicated Table 4.8 implies the indicators financial resource as deficiencies with grand mean of 2.5. Firstly, the involvement in SWM is not generating adequate revenue, 56.5 percent of the respondents supported this financial indicator shows constraint. Secondly, The indicator ('vehicle have fuel always and ready for use) , was scored as disagree with mean value 2.44 this was also confirmed in percentiles that 51 % were recorded as disagreed which show the poor condition of the financial resource. In addition, the statistical response on the indicator (adequacy of receiving a fair fee for its solid waste management), respondents rated 76.9% as disagreed .This was also supported by the respondent's opinion that the companies lack financial resource to plan for the promotion of waste reduction, recycling and recovery programs.

An interview conducted with the private waste service delivering company representative's response related to indicators of financial condition also indicates poor condition. Particularly interviewees' claimed; the existing payment as unfair. They also added their complaint on the waste management agency. According to the interviewees', the agency has changed the existing measurement from meter cube to kilogram and it introduced the far sanitary site. As a result of this change their income has decreased dramatically and a significant number of companies cut their employees and many of them have stop their job. In addition to this, a statistical

association was measured between effective solid waste management (collection, transportation, and disposal) with financial factor indicators separately using Spearman's correlation coefficient . The finding indicates that financial factor has a significant weak positive association with a collection at (r=.29, N=108,P=.002). Financial factor in turn has significant moderate positive relation with transportation and disposal (r=.51,N=108 P=.000) and (r=.45,N=108,P= .000) respectively.. This finding was consistent with the related literature of Fianko, (2014) which investigated the positive association between challenge indicators and SWM .

The combined statistical evidence and interview about the condition of financial indicators from the surveyed firms indicated that financial resource is the main constraint on the waste service delivery practice in the research area. Hence, financial constraint is one of the major factors negatively influencing the effectiveness of solid waste management practice. The most enhanced financial position in this sector shall be correlated with the improved solid waste management (collection, transportation, and disposal).

Edmalem Bewket (2013) identified the status of financial aspect as a hindering factor which determines the sustainability of effective SWM in Bahir Dar city.

This finding is also in line with the literature (Shubeler , 1996; Coffey and Coad,2012 ; Hufane ,2015)

Technical condition and effective solid waste management practice.

Technical condition was measured with the indicators like adequate and modern waste management equipment with enough spare parts, skilled personnel and adequate infrastructure as table 4.9 shows .

In summary, the respondents mark all (sub) indicators, that make technical indicator with disagreed as the entire or grand mean value of all these indicators are turned out to be 2.25.

In consequence, it evident those technical aspects pose serious influence on solid waste management practice in Addis Ababa. lack of adequate modern waste disposal equipment, not frequent use of environmentally adaptable and maintainable equipment, the city itself not being well planned with appropriate infrastructure suitable for waste collection and transportation, most of the companies falling to give regular training to their employees and inaccessibility of

spare parts for damaged and broken vehicles and equipment are more or less the influencing factor for effective waste management practice coming from the technical aspects.

Moreover, the correlation coefficient assessed between the technical condition and SWM (collection, and transportation) separately indicates the significant positive association with (r=.34,N=108, P= .000) , (r=.30, N=108,P=.001) respectively. However, technical condition and set of effective disposal system have no linear significant relationship (P>0.05)

The combined result from quantitative and qualitative analysis indicates that technical conditions were at poor level. Hence, poor level of technical condition is one of the negatively influencing factor of effective solid waste management. This finding is consistent with the literature (Shubler ,1996, Coffey and Coad,2012 ; Fianko, 2014 ; Edmalem Bewuket ,2015 ;Un-Habitat ,2013)

Institutional condition and effective solid waste management

Institutional condition was conceptualized as proper organizational set up for responsibility, integrated participation between private and public agencies ,sufficient and a consistent contract between the service provider ,beneficiaries and the authority and waste managing companies that responsible for service reliability.
All negatively recorded indicators were recorded as a positive response.
From table 4.11 respondents opinion on the statement of indicators under institutional condition has an entire mean value 2.55. Except for indicator (company has faced frequent customer complaint about solid waste management on its assigned jurisdictions), all reveals the adverse effect on the solid waste management. Meaning, responses of the respondent were positioned as (50%) above and below disagreed. In percentile terms, (69.4%) of the respondent agreed as there was no proper institutional set-up for SWM. Similarly, (65.8%) of the respondent said there is no involvement of several institutions in SWM.

The involvement of various stakeholders in SWM, including national, local governments, multilateral and bilateral development partners, NGO and citizens working well. However, early involvement of representatives from all concerned stakeholders in the planning process was not practiced in Addis Ababa. (Hayal Desta et al., 2014)

According to Contreau-Levine & Coad (2000), the contractual periods should enable economic depreciation of assets and repayment of loans, developing systems and facility sizes to make financially feasible. Nevertheless, most of the respondents (81%) disagreed on the existence of consistent and sufficient waste management contract with the cleaning agency.

Using interview, the researcher confirmed that the duration of a contract agreement between the cleaning agency and private solid waste managing firms is for three months and renewed every three months, which is too short. Besides, according to the manager of Yes private solid waste collector, the agreement does not allow to work in a flexible manner.

For example, the waste management agency changed its policy many times without our participation and consent.

Finally, 59% of the respondents expressed their opinion as there were no frequent customer complaints on their respective companies. But the interview made with the agency indicates that private waste collecting firms sometimes complained.

This discussion is further supported by the existence of a positive correlation between technical condition indicator and collection, transportation and disposal separately. The Spearman's correlation coefficient result was significant at (P<.05) that (33.7%) institutional strength positively associated with the effective collection (40.1%) institutional strength associated with effective transportation. In fact, the correlation between institutional strength and solid waste disposal were statistically insignificant (p=.63)

The significant positive correlation with different strength reveals that the current ineffective solid waste management practice associated with weak institutional capacity in the study area. The combined information from survey, interview and observation indicates weak institutional capacity on the waste management that would negatively influence the service delivery practice. Therefore, the city of Addis Ababa needs to encourage both individuals and private institutions to provide proper SWM along with upgrading the required equipment to strengthen the service delivering system.

Again this finding is consistent with the literature (Hayal Desta et al., 2014) that reveals the lack of effective public participation and inadequate governance in the waste management system were institutional aspect weakness.

It is also in line with literature of (Shubler,1996; Coffey and Coad,2012 ; Fianko, 2014 ; Hufane ,2015)

Social condition and solid waste practice

Social condition was constructed as the condition of workers, the attitude of beneficiaries about waste workers and awareness raising programs. Respondents were asked to react to several statements on these indicators intended to weigh the status of indicators.

The response was scored as described in table 4.10

To sum up, regarding social aspects, respondents said they do not agree with payment and additional work benefits being reasonable in their respective companies. On the other hand, they (employees) believed that they always wear safe and protective gloves and clothes during their work, was scored as disagreed. When strongly disagreed is summed up with it(disagreed), the category will constitute 67% of the total respondents, which means they do not think beneficiaries have the good attitude toward them.

Rathana (2009) stated the fact that a lack of public awareness and co-operation are root causes of solid waste service delivery practices. Likewise in Addis Ababa, lack of awareness in communities, private sectors, and decision makers is one of the problems.

In this regard, almost an equal number of respondents have divergent view that (36%) and (39%) respondents said they agreed and disagreed with their respective companies carrying out awareness raising programs on general public health and management of waste, respectively.

Furthermore, there is moderate significant positive correlation between social condition indicators as influencing factors and effective solid waste management(collection, transportation and disposal) separately at statistical level below of 5%   with (r=.32,.42,.31) respectively. This relationship has an indication that the current ineffective solid waste management practice associated with low social conditions in the surveyed firms.

This survey finding using statistical value ,interview and observation was further supported by literature (Shubeler,1996; Coffey and Coad,2012; Fianko , 2014 , Edmealem Bewuket,2013, and Hufane ,2015)

Political condition and solid waste practice

Effective solid waste management is also factored by the political activity of the authority. It will have positive influence if the authority gives high priority (instead of political interference) and adequate policy and law that can promote about solid waste management, continuous and independent enforcement by the agency.

The indicator (there is adequate policies and rules that promote for effective SWM), is confirmed by reviewing policy/legal documents such as the country's environmental policy and the recent SWM proclamation No.513/2007 which allow for privatization in solid waste services. The information obtained from the cleaning agency shows that 27 private firms and above 500 MSEs are engaged in the cities waste management service. From the survey result, most of the respondents also supported this fact with a mean value of 3.76.

Similarly, the indicator whether continuous enforcement has existed on the proper solid waste management was rated by the respondent as ineffective.

Based on Moreno,Rios & Lardinois , (1999) whether the service is totally or partially privatized the responsibility for control and supervision must continue to be a municipal function . But; in the study area the data analyzed shows that 72.3% sum up with disagreement and strongly disagree. while,23.1% keep undecided and the remaining shows agreement on the existence of continuous enforcement.

Respondents opinion on the indicator whether government gives high priority or not score shows deficiency as disagreement.

Finally, respondents view was distorted on the indicator whether the agency is independent on the enforcement. The entire opinion of respondents indicates that political aspect influence as moderate or the government has the good understanding for solid waste management but there is enforcement problem by the waste cleaning agency. an interview conducted with research officer from the cleaning agency supports this fact that the waste management from city administration was among top five priorities.

However, information collected using interview from managers of private waste collectors , the newly sanitary site which is located at Oromia region has community acceptance problem due to its negative externality. The private waste collectors also claiming additional payment as they incurred cost of fuel to reach long distance.

But, the correlation assessed between set if political condition indicators and SWM (collection, transportation and disposal) indicates statistically insignificant relation or no linear association.

CHAPTER FIVE

5. CONCLUSIONS AND RECOMMENDATION

5.1 CONCLUSIONS

The study has been conducted to address the current solid waste management practice and factors influencing its effectiveness in Addis Ababa. Based on the findings, the current solid waste service delivering practice of Addis Ababa is characterized by the huge generation of solid waste coupled with unbalanced solid waste service. The study found that key element of effective SWM such as waste collection, transportation and disposal practiced by private firms in the city was ineffective. The result shows that the survey companies are unable to fulfill most of the indicators of effective SWM practices in the research area.

This ineffective SWM practice in the survey companies was associated with the following constraints:

Insufficient financial allocation by government for private solid waste management companies - like service recovery charge, budget allocation, and the municipality willingness to pay those involved in waste service delivering and insufficiency of funds for promoting waste reduction, recycling were examined as influencing factor of effective solid waste management.

Next, technical skill problem like modern waste management vehicle and equipment with accessible spare parts, professional qualification of personnel, lack of infrastructures like accessible internal road were challenges in addressing effective solid waste management in Addis Ababa city. In addition, social influences such as city public awareness on solid waste management, the lack of adequate salary and benefits and low level of beneficiary's attitude for waste workers were examined as influencing factor of effective solid waste management. Also, institutional factors like an improper institutional setup, lack of integrated solid waste management, and lack of involvement by many institutions in SWM, insufficient and consistent waste management contract period with the municipality, and no integrated solid waste management

practice between private and public agencies were factors influencing effectives of SWM. Finally, political aspect influences were moderate except for enforcement problems and socially unaccepted disposal site.

Furthermore, Spearman's correlation measurement indicated that set of indicators as influencing factors (technical, institutional, social and financial conditions) ,were significantly and positively associated at different strength with sets of effective SWM practice measured with (collection, transportation and disposal).   This indicates that the current ineffective SWM practice was associated with factors of financial constraint, technical problem ,low social condition and weak institutional set-up. On the other hand, political factor showed insignificant correlation with collection, transportation and disposal .

5.2 RECOMMENDATIONS

The following recommendations were made in conclusion of the study;

Financially, the city government should allocate enough money for the provision of solid waste management. Improving the service payment rate of private collectors, providing incentives, designing revenue generation mechanisms and access to credit system are required. The newly introduced payment system for private collectors should be revised through detail information about their cost of collecting and transporting.

Technically: For waste management to be effective there should be proper waste collection systems with qualified personnel, availability of modern vehicle and equipment so as to reduce environmental pollution and prevent health hazards

The city government and private firms should ensure better waste management through waste reduction, reuse, and recycling of compost waste. The government should support business communities through pilot projects, funding training, and technical assistance information exchange follow up support and monitoring.

Institutionally: The agency should facilitate proper institutional structure and integrated waste management between stakeholders. It should elongate the duration of the contract agreement with private waste managing firms for potential cost recovery; besides, the contract agreement should be modified to allow the private firms work in a flexible manner. There should be continuous assessment of satisfaction about the service delivery and supervision function as well.

Socially: The cleaning agency and service delivering firms should provide awareness raising programs to inform the community about the danger and the consequences of waste, especially on illegal open dumping. Private waste managing firms also need to improve the status and conditions of workers by providing clothing adequate salary and benefits.

Politically: the research found out that there are policies and laws that promote about effective SWM but it lacks strict enforcement by-laws by the waste cleaning agency such that dumping

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of waste on open pits and drainages are common. This research recommends that existing by-laws should be strictly enforced in all areas of the city.

5.3 Further suggestion for future research

This study has focused on the waste management practice which involves private limited companies only. In fact, the current service deliveries by private limited collectors were limited to collect solid waste only from institutional and commercial activities and the household waste is the responsibility of MSEs.

Therefore, It is imperative to suggest further research area as a comparative study between private limited companies and MSEs in Addis Ababa.

Finally, this study was also limited to assess the current SWM practice by considering five factors as influencing the effective SWM practice measured with (collection, transportation and disposal). But, further study can be conducted by assessing factors which were not included in this study.

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APPENDIXS

APPENDIX A

QUESTIONNAIRE FOR EMPLOYEES OF PRIVATE SWM COMPANY

Introduction

This study is being conducted by a student as part requirement for the award of the degree of Master of Arts in General Business administration at St. Mary's University. The study is intended to Solid waste management practice and factors influencing its effectiveness in the case of selected private companies in Addis Ababa city. Your views as a worker of solid waste management are considered part and parcel of this study. Please provide the following information to be the best of your ability, and return your completed questionnaire to the researcher. Any information provided is strictly confidential and will not be relayed to a third party or used for any other purpose other than making this academic report for this study.

Part 1: Background Information

Your company name_____

Your gender?

Male [ ]   Female [ ]

Your age

16 – 25 years [ ]

26 – 35 years [ ]

36 – 45 years [ ]

Above 45 years [ ]

Your highest level of education

Masters Degree & above [ ]

Diploma [ ]

Level [ ]

Primary (6-8) [ ]

Others [ ]

Department of work:

_____

Your position in this Organization

Collector [ ] Driver [ ] A Admin [ ] Other [ ]

Part II: Solid Waste Management

SA= Strongly Agree, A= Agree, NC= No Comment, DA= Disagree, SDA= Strongly Disagree   SWM= Solid Waste Management

Please tick (√) to the statements given in the table by checking the alternative most applicable to you. Do not choose more than one alternative in one statement.

1	**Financial constraint indicators**	SA	A	NC	DA	SDA
1.1	There is adequate revenue generation, for provision of effective SWM within our company					
1.2	Our vehicles always have fuel and ready for use all the time					
1.3	Working on the solid waste collection and transportation business service is attractive business					
1.4	Our company is receiving fair fee for its solid waste collection and transportation service.					
1.5	There is sufficient money for the promotion of waste reduction, recycling and recovery programs.					
2	**Technical condition indicators**					
2.1	Our company has adequate and modern waste management equipment.					
2.2	Our company usually uses environmentally adaptable and maintainable equipments.					
2.3	Addis Ababa city is well planned with appropriate infrastructure to collect and transport waste					
2.4	Waste personnel in our company are regularly getting training.					

2.5	There are accessible spare parts when vehicles and equipment s are breakdown.					

3	**Social condition indicators**					
		SA	A	NC	DA	SDA
3.1	I am paid adequate salary and sufficient additional benefits for my work at our company.					
3.2	Waste workers always wear safe and protective gloves and and clothes during their work at our company.					
3.3	Beneficiaries have good attitude for waste workers.					
3.4	Our company carries out awareness raising programs on general public health and management of waste					

4	**Institutional condition indicators**					
		SA	A	NC	DA	SDA
4.1	No proper institutional set-up for solid waste management service					
4.2	Several institutions or agencies are not involved in SWM					
4.3	We have sufficient and consistent waste management contract period with the municipality.					
4.4	There is no integrated solid waste management practice between private and public agencies.					
4.5	Our company has faced frequent customer complaint about solid waste management on its assigned jurisdictions.					
5	**Political condition indicators**					
		SA	A	NC	DA	SDA
5.1	There is adequate policies , laws that promote for					

		SA	A	NC	DA	SDA
	effective SWM					
5.2	The assembly enforces to implement the existing SWM law					
5.3	The assembly is independent when it monitor SWM companies.					
5.4	The government gives high priority to SWM					

6	**Effective Solid waste collection indicators**	SA	A	NC	DA	SDA
6.1	Frequency of waste pick – up are strictly followed by our company.					
6.2	There is full and continuous training on solid waste collection in our company.					
6.3	Our company have facilitated enough number of collection points near to all beneficiaries					
6.4	Our Company maintains waste spillover to the ground at collection is cleaned					
7	**Effective Solid waste transportation indicators**					
7.1	Company has sufficient manpower and vehicle to transport solid waste					
7.2	Nature of traffic condition along collection route has jamming					
7.3	Supervisor records the daily number of trips, tonnage of waste and route plan to drivers					
7.4	Our company use covered vehicles and there is no spillover of solid waste up on transport.					

7.5	There is no adequate internal roads (alternative roads) and traffic condition along collection route has overcrowding					
8	**Effective Solid waste disposal indicators**					
8.1	The existing disposal site is far-away from our collection point					
8.2	Municipality did not provides designated and accessible land fill site					
8.3	The existing disposal site is open and it has bad smell to the community					
8.4	Our company disposes waste at designated land fill by law and it is Environmentally safe					
8.5	Presence of animal on the disposal site is common					

Dear respondent, using the following space you can put your general idea about the current SWM service delivering practice and its basic challenges you regard as necessary

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በግል ድርጅት ውስጥ በቆሻሻ አሰባሰብና አወጋገድ ስራ ላይ ለተሰማሩ ስራተኞች የተዘጋጀ መጠይቅ

ይህ ጥናት በተማሪ የማሴራ ሲሆን አላማውም በአጠቃላይ የ ቢዝነስ አስተዳድር (General MBA) ከቅድስተ ማሪያም ዩኒቨርስቲ በማስተርስ ዲግሪ ለመመረቅ ነው። ጥናቱ መሰረት የማያደርገው በአዲስ አበባ ከተማበደረቅ ቆሻሻ አሰባሰብና አወጋገድ አገልግሎት ስራ ላይ የተሰማሩ የግል ድርጅቶች ስራውን በተቀላጠፈ ሁኔታ እንዳያከናውኑ ማነቆ የሆኑባቸውን ችግሮች ለመለየት ነው። በመሆኑም ይህ ጥናት የተሳካና ችግር ፈቺ ይሆን ዘንድ በስራው ላይ የተሰማሩ ስራተኞች በመጠይቁ ላይ የማስጡት ምላሽ ከፍተኛ አስተዋጽአ አለው። በተጨማሪም በመጠይቁ የ ማስጠውምላሽ ጥናቱን ለመስራት ብቻ የ ማዋል ይሆናል።

ቅ፩ 1. የ ተጠያቂ ው የ ግል መረ ጃ

የ ማስ ፋብ ት ድር ጅ ት ስም ----------------------------

ፆ ታ

  ወን ድ ☐   ሴት ☐

ዕ ድሜ

18 – 25 ዓ መት ☐   36 – 45 ዓ መት ☐
26 - 35 ዓ መት ☐   ከ 45 ዓ መት በ ላ ይ ☐

የ ት ምህ ር ት ደረ ጃ

ማስ ተር ስና ከ ዚ ያ በ ላ ይ ☐   ደረ ጃ (Vocational level) ☐
  ዲግ ሪ ☐   ሁለ ተኛ ደረ ጃ (9 – 12) ☐
ዲፕ ሎ ማ ☐   አ ን ደኛ ደረ ጃ (6 – 8) ☐

የ ስራ መደብ (Position)

ቆሻሻ መስ ብሰብ [ ]   ሹፈC [ ]   አስ ተዳድC [ ]   ሌላ [ ]

ቅፅ 2. የ ደረቅ ቆሻሻ አያያዝ (Solid waste Management)

ከ ዚህ በ ታች ከ ተስ ጠ አ ማራ ጮ መካከል የ መረ ጡት ላ ይ (X) ይህን ምል ክት ያ ድር ጉ፡ ፡
እ ባክ ዎን ለ አንድ ጥያ ቄ ከ አንድ በ ላ ይ ምል ክት አ ያ ድር ጉ፡ ፡

1	የ ሃ ብት (Financial Resources) ተ ጽኖ	በ ጣም እ ስ ማማለ ው	እ ስ ማማለ ው	አ ስ ተያ የ ት የ ለ ኝም	አ ል ስ ማማም	በ ጣም አ ል ስ ማማም
1.1	በ ድC ጅ ታ ችን ወስ ጥ ደ ረቅ ቆ ሻ ሻን በ አግ ባ ቡ ለ መስ ብ ሰ ብ ና ለ ማ ጓ ጓ ዝ የ ሚ ያ ስ ች ል በ ቂ ገ ን ዘ ብ አ ለ ፡ ፡					
1.2	ተ ሸ ከ C ካ ሪ ዎ ቻ ችን ዘ ወ ት C በ ስ ራ ላ ይ እ ያ ሉ የ ነ ዳ ጅ እ ጥ ረ ት ሞ ሆ ነ የ መ ዘ ግ የ ት ች ግ C የ ለ ባ ቸ ወ ም					
1.3	የ ደ ረ ቅ ቆ ሻ ሻ አ ሰ ባ ሰ ብ ና አ ወ ጋ ገ ድ ስ ራ ላ ይ መስ ራ ት አ ዋ ጭ ነ ወ ፡					
1.4	ድC ጅ ታ ችን ቆ ሻ ሻ ን ለ መ ስ ብ ሰ ብ እ ና ለ ማ ጓ ጓ ዝ የ ሚ ያ ስ ከ ፍ ለ ው ገ ን ዘ ብ ተ መ ጣ ጣ ኝ ነ ወ ፡ ፡					

1.5	ቆሻሻን ከምንጩ ለመቀነስና መልሶ ለመጠቀም በቂ የሆነ ገንዘብ አለን፡፡					
2	ቴክኒካል ተጽኖ (Technical Aspect)					
2.1	ድርጅታችን ደረቅ ቆሻሻን ለመሰብሰብና ለማጓጓዝ የሚያስችል በቂና ዘመናዊ መሳሪያ አለው፡፡					
2.2	ድርጅታችን የሚጠቀማቸው መሳሪያዎች እና ተሽከርካሪዎች ከአባቢው የአየር ሁኔታ ጋር ተስማሚና በቀላሉ የሚጠገኑ ናቸው፡፡					
2.3	አዲስ አበባ ከተማ ቆሻሻን ለማጠራቀምና ለማጓጓዝ የሚያችል የመሰረተ ልማት አላት፡፡					
2.4	በቆሻሻ አወጋገድ ስራ ላይ ለተሰማሩ ሰራተኞች በየጊዜው ሥልጠና ይሰጣል፡፡					
2.5	ተሽከርካሪዎች በሚበላሹ ጊዜ በቀላሉ መለዋወጫይገኛል፡፡					
3	የማህበረሰብ ተጽኖ (Social Aspect)					

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3.1	በ ድር ጅ ታ ች ን ለ ምን ስ ራ ው ሥራ ተመጣጣኝ ደ መዎ ዝ ና ጥቅ ማ ጥቅ ም እ ና ገ ኛ ለ ን ፡ ፡		82			
3.2	የ ፅ ዳ ት ሰ ራ ተ ኞ ች በ ስ ራ ወ ቅ ት ሁ ል ጊ ዜ ም ለ ቆ ሻ ሻ ጥ ን ቃ ቄ አ ስ ፈ ላ ጊ አ ል ባ ሳ ት ይ ለ ብ ሳ ሉ ፡ ፡					
3.3	ተ ጠ ቃ ሚ ዎ ች በ ቆ ሻ ሻ አ ሰ ባ ሰ ብ ና አ ወ ጋ ገ ድ ስ ራ ለ ተ ሰ ማ ሩ ሰ ራ ተ ኞ ች ጥ ሩ አ መ ለ ካ ከ ት አ ላ ቸ ው ፡ ፡					
3.4	ድ ር ጅ ታ ች ን ስ ለ ቆ ሻ ሻ አ ያ ያ ዝ ና አ ወ ጋ ገ ድ ለ ነ ዋ ሪ ዎ ች የ ግ ን ዛ ቤ ማ ስ ጨ በ ጫ ት ም ህ ር ት ይ ሰ ጣ ል ፡ ፡					
4	**ተ ቋ ማ ዊ አ ስ ራ ር ተ ጽ ኖ (Institutional Aspects)**					
4.1	በ ደ ረ ቅ ቆ ሻ ሻ አ ሰ ባ ሰ ብ ና አ ወ ጋ ገ ድ ዘ ር ፍ የ ተ ደ ራ ጀ መ ዋ ቅ ራ ዊ አ ስ ራ ር የ ለ ም ፡ ፡					
4.2	ብ ዙ ተ ቋ ማ ት ና ባ ለ ድ ር ሻ አ ካ ላ ት በ ደ ረ ቅ ቆ ሻ ሻ አ ሰ ባ ሰ ብ ና አ ወ ጋ ገ ድ ስ ራ እ የ ሰ ሩ አ ይ ደ ለ ም ፡ ፡					

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4.3	በድርጅታችንና በከተማ አስተዳድሩ መካከል በየጊዜው የማይለዋወጥ በቂ ስምምነት አለ፡፡					
4.4	በደረቅ ቆሻሻ ላይ የግልና የመንግስት ድርጅቶች በመቀናጀት እየሰሩ ነው፡፡					
4.5	ድርጅታችን በሚሰጠው አገልግሎት ከደንበኞች ተደጋጋሚ ቅሬታ ይገ ጥመዋል፡፡					

5	የ ፖለቲካ ወይም የ ሕግ ተጽኖ (political/Legal Aspects)					
5.1	የ ደረቅ ቆሻሻ አሰባሰብና አወጋገድ አስመልክቶ ለአሰራር አመቺ ፖሊሲና ህግ (መመሪያ) አለ፡፡					
5.2	የ አዲስ አበባ አስተዳድር የ ወጡ ህጎችና መመሪያዎች እንዲተገበሩ በትጋት ይሰራል፡፡					
5.3	የ ፅዳት አስተዳድሩ ቁጥጥር በሚያደርግበት ወቅት ከ ማንኛውም አካል ተፅዕኖ ውጭ ይሰራል፡፡					
5.4	የ ደረቅ ቆሻሻ አሰባሰብና አወጋገድ					

	ስራ በመንግስት ከፍተኛ ትኩረት የሚሰጠው ነው። :		84			
6	**የ ደረቅ ቆሻሻ አሰባሰብ (Collection)**					
6.1	ድር ጅታችን ለደንበኞቹ ቆሻሻ በየ ጊዜው እንዲነሳ ጥብቅ ቁጥጥር ያደርጋል። :					
6.2	በ ድር ጅታችን ወስጥ ለሰራተኞች ስለ ደረቅ ቆሻሻ አሰባሰብ በቂ እና ተከታታይ ስልጠና ይሰጣል። :					
6.3	ድር ጅታችን ለተጠቃሚዎች አመቸና ቅርብ በሆነ ቦታ የ ቆሻሻ ገንዳ ይዘ ጋጃል። :					
6.4	በ ቆሻሻ ገንዳ ዙሪያ ያለ አካባቢ ሁሌም ንፁህ ነው። :					
7	**የ ደረቅ ቆሻሻ የ መጓጓዝ ሁኔታ (Solid waste Transportation)**					
7.1	በ ድር ጅታችን ቆሻሻን ለ ማጓጓዝ በቂ ተሸከርካሪና የ ሰው ሃይል አለ። :					
7.2	የ ትራፊክ ሁኔታ ደረቅ ቆሻሻን ለ ማጓጓዝ ችግር ፈጥራል። :					

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7.3	ድር ጅታችን በየቀኑ ስላለ የመኪና ምልልስ እና የቆሻሻ መጠን ይቆጣጠራል፡፡					
7.4	ቆሻሻ የምናንጉዝበት መኪና የተሸፈነ በመሆኑ አካባቢውን ለብክለት የማያጋልጥ ነው፡፡					
7.5	በቂ አማራጭ መንገድ ባለመኖሩ ቆሻሻን ለማጓጓዝ ተቸግረናል፡፡					
8	**የ ደረቅ ቆሻሻ አወጋገድ (Disposal)**					
8.1	በአሁኑ ወቅት ያለው የቆሻሻ መጣያ (ማስወገጃ) ከምን ሰበሰብበት ቦታ ሩቅ ነው፡፡					
8.2	የፅዳት አስተዳደሩ አመቺ የሆነ የቆሻሻ መጣያ ቦታ አላዘጋጀም፡፡					
8.3	የ ደረቅ ቆሻሻ መጣያ ቦታው ክፍት በመሆኑ ለአካባቢውነ ዋሪ መጥፎ ሽታ ፈጥሯል፡፡					
8.4	ድር ጅታችን ሁሌም ቆሻሻ የ ሚጥለው በህግ በተፈቀደ ቦታ ነው፡፡					
8.5	አሁን ያለው የ ቆሻሻ					

መጣያ ቦታ የተለያዩ እንስሳት ይገኙበታል፦		86			

የተከበራቹ ተጠያቂዎች ባአጠላቃይ በደረቅ ቆሻሻ አሰባሰብ እና ኣወጋገድ ስራ ላይ ያሉ ዋናዋና ችግሮችን ወይምአስተያየት ከዚበታች ባለዉከፍት ቦታ ይግለጹ ፦ ---
----

"ከ ቆሻሻ የጸዳ አከባቢ ለመፍጠር እንተባበር"

APPENDIX B

INTERVIEW GUIDE FOR KEY INFORMANTS PRIVATE WASTE MANAGING COMPANIES

This questioner is prepared only for academic purpose which is an instrument for this thesis entitled' Challenging factors of SWM service delivered by private companies: The case of Addis Ababa city. You have been selected as main respondent because of your experience and knowledge in solid waste collection and transportation service delivery. So your input is very valuable in this survey and hence you are kindly requested to spare a few minutes to answer these questions.

General information

 1. Date of interview --------------------------------------

2. Companies name ---------------------------------

3. City and Office location   --------------- Tel No. ----------------------

4. Service year   --

4. Sex of respondent (Interviewee)   Male   Female

3. Indicate your profession --------------------------------

5. Level of formal education -------------------------------

6. What is the type of your company (PLC, Sol proprietor etc)   ---------------------

6. What are your main services of your company ?

8. What are the major challenges you face in waste management and how do you deal with them?

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9. What is the financial status of your company and how does this affect the solid waste management in the city?

10. What is (are) the sources of funds for working capital (for paying salaries, buying fuel and repairing vehicle) --------------------------------

11. Would you say that the municipality is paying the service fee timely?

APPENDIX C

Annex C: Interview Guide for Addis Ababa municipal staffs

Title……………………………Sex………………..

Department.......................................

1. What are the minimum criteria to establish private SWM companies?

2. What is the objective of organizing these private companies?

3. How the budgeting is allocated to solid waste management ?

4. What is the amount of the city's solid waste management budget that is for sweeping, small drain cleaning, solid waste collection, solid waste disposal and maintenance of the solid waste and do your budget is flexible to activities?

5. Do you have policies that charge solid waste beneficiaries? If yes how do you distribute the fee for private waste collectors?

6. Did the city provide community education, general public education, and public participation workshops initially to support the transition to a pivatization system? If yes, please provide further information.

7. What are the current challenges in solid waste management practice

8. Does the municipality have complaints and feedback mechanism?

9. Are there any problems, observations or issues that you would like to share with us with regard to solid waste waste management systems and your experience with them (related to control , reliability , cost , political intervention and performance ?

THANKS FOR YOUR POSITIVE RESPONSE

Appendix D

Lee Cronbach' Reliability Estimation Table

Cronbach's alpha	Internal consistency
α≥0.9	Excellent
0.8≤ α ≤ 0.9	Good
0.7 ≤ α <0.8	Acceptable
0.6 ≤ α<7	Questionable
0.5 ≤ α < 0.6	Poor
α < 0.5	Unacceptable

Reliability Statistics

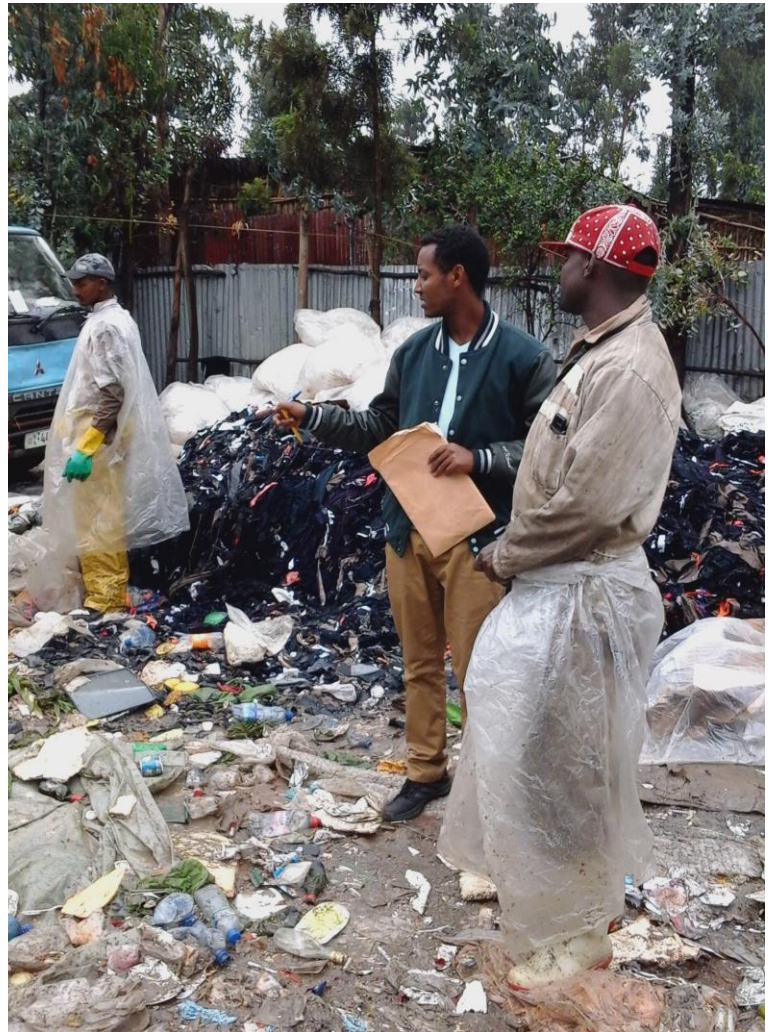| Cronbach's Alpha	N of Items
.840	37

Appendix E

PHOTOGRAPHS

photo 1 : an interview with key informants

photo 2 : Fortune, cyclic disappointment, Mar 27, 2016.

photo 3 : spilled over waste around container

photo 4 : improper solid waste collection