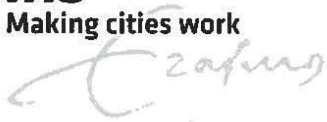


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Thesis

Effect of poor project performance on the quality of housing construction: Case of condominium houses in Addis Ababa

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UMD 8



Master's program in Urban Management and Development
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**EFFECT OF POOR PROJECT PERFORMANCE ON THE QUALITY OF
HOUSING CONSTRUCTION**

CASE OF CONDOMINIUM HOUSES IN ADDIS ABABA

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Summary

The construction industry in developing countries faces challenges of different kinds. Most of them are characterized by time delay, cost overrun and poor quality construction mainly because of poor performance of the contractor. To tackle the problems and to improve their performance developmental activities such as capacity building schemes has been taking place. Likewise, in Ethiopia poor construction performance is evident in the construction of condominium houses. Major and minor construction defects are observed in completed housing units and households are subject to unexpected maintenance costs.

The construction of condominium houses in Addis Ababa started in 2004 through Addis Ababa Integrated Housing Development Project (AAIHDP). The program has an integrated approach to solve the housing shortage through mass construction of low cost houses and to reduce unemployment rate through engaging a large workforce in the construction process. Accordingly, the project involves emerging contractors and MSEs for the main construction works and the provision of prefabricated construction material respectively. The Housing Development Project Office is responsible for managing and administering of the project with the assistance of consulting firms engaged in the project as advisor and supervisors.

The main objective of this study is to identify why small-scale contractors and MSEs struggle to deliver good quality houses despite the AAHDP Office's efforts to promote them and to draw conclusions about what needs to be improved for them to be able to improve their performance. The study also aimed to identify major and minor defects in the newly constructed houses. The objective is addressed through three research questions that are formulated to find out the effect of the capacity building schemes, to find out the constraints of small-scale contractors and to identify defects observed in the constructed houses.

This research involves both qualitative and quantitative approaches for data collection and analysis. To gather quantitative data, four survey questionnaires were administered to small-scale contractors, MSEs, consultant and housing occupants. For qualitative approach, in-depth interviews were carried out to purposefully selected respondents. In addition, observation and film were used. Lastly, data were collected from documents such as policy documents, reports and contract documents. The main activities in the research design are core problem identification, research objective to tackle the problem, operationalize the variables through intensive literature review, identify population, data collection and data analysis and conclude the research. The selected project site is 'Akaki Kality' sub-city because the project consists of both finished project where households already handed over the houses and on-going project where construction is still undergoing

The findings concerning the support programs indicate that HDPO provides capacity building schemes such as training, financial, material and equipment supports to small-scale and MSEs. The findings further reveal that the training provided to small-scale contractors is only a 3-4 days training which is only concerned with introducing the program. On the other hand, the training given to MSEs involves management and technical support but still it is short-term training. The

training in general is not well designed to improve technical and management capability small-scale contractors and MSEs. The consultants, head of MSEs' work progress and construction officer in HDPO confirmed that the training is not adequate or not even close to equip MSEs with sufficient technical and managerial knowledge. Thus, the training has minor effect on improving the performance of small-scale contractors and MSEs during executing their tasks.

The lack of support especially in technical and managerial capability is reflected through construction of poor quality houses. The finding reveals that most houses have defects of similar kinds. Most defects are observed during handing over and the problem is exacerbated after occupancy. The most visible defects are those related to sanitary and electrical fixtures, door handles and building structures, which in the opinion of the consultant might affect the functionality and durability of the building.

The research finally analyses the constraints that could contribute to the poor performance of small-scale contractors and MSEs. The main constraints identified are technical incapability of MSEs and managerial incapability of both small-scale contractors and MSEs. Besides more constraints related to stakeholder management, culture, material, environment and equipment are identified. Problem in collaborative working atmosphere, lack of construction management practice, lack of quality control practice, lack of strict supervision, lack of testing mechanism, lack of technical and managerial knowhow, lack of equipment support are some of the constraints.

In general, the developmental program AAIHDP designed does not consider the level of small-scale contractors and MSE. Thus, the mechanism introduced to enhance capacity of small-scale contractors and MSEs is not adequate to bring impact on their responsiveness in carrying out their duty. To make things worse small-scale contractors are less motivated to execute their task due to less access to finance, insufficient profit and long payment processing. In addition, the majority of MSEs is less motivated due to insufficient profit, lack of working space, supply of less quality raw material and fear on the sustainability of their job.

Finally based on the findings the researcher recommends that special attention need to be given to both small-scale contractors and MSEs in order to improve their performance. In addition, the whole construction management process should be improved then cooperation between stakeholders, strict inspection of construction materials and inspection of works executed should be practiced.

Key words: MSEs, small-scale contractors, AAIHDP, construction performance, and defects and capacity building

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ACRONYMS

AACA	Addis Ababa City Administration
AAHA	Addis Ababa Housing Agency
HDPO	Housing Development Project Office
AAHDPO	Addis Ababa Housing Development Project Office
AAIHDP	Addis Ababa Integrated Housing Development Program
CSA	Central Statistical Authority
KFW	Kreditanstalt für Wiederaufbau, (German <i>Reconstruction Credit Institute</i>)
DEG	Deutsche Investitions- und Entwicklungsgesellschaft mbH, Cologne, Germany (Promoter of entrepreneurial development cooperation)
DFID	Department for International Development
DWCP	Decent Work Country Program
GDP	Gross Domestic Product
ILO	International Labour Organization
MDGs	Millennium Development Goals
MSME	Medium, Small and Micro Scale Enterprises
SMEs/MSEs	Small and Micro Scale Enterprises/Micor and Small Scale Enterprises
TVET	Technical Vocational Education Training
UN	United Nations
UNDP	United Nations Development Program
MFIs	Micro Finance Institutions
CIB	Construction Industry Board
GTZ-IS	Deutsche Gesellschaft für Internationale Zusammenarbeit
MHE	Melese Hailu Engineering PLC.
CBE	Commercial Bank of Ethiopia
HCB	Hollow Concrete Blocks
FIDIC	‘Federation Internationale des Ingenieurs Conseils’ (International Federation of Consulting Engineers)

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Chapter 1: Introduction

This chapter comprises of three parts the first part present general information about the study area, Addis Ababa and specific information about the housing condition in the city. Then the second part consists of a description of Addis Ababa Integrated Housing Development Program (AAIHDP) together with its derivatives. The third part of this chapter describes the problem the research intended to address. Then it defines objectives to tackle the problem stated. The significance of the study and scope of the project is presented in the last section of this chapter.

1.1 Preface

Ethiopia is one of the poorest countries in the world where 38.9% of the population live below the poverty line. According to World Bank's 2010 censuses the country's gross national income, GNI is EUR 302 per capita. Only 30% of the population are literate and 20.5% of the population are unemployed, (World Bank 2010).

Addis Ababa, the capital city of Ethiopia is one of the fastest growing cities in the continent with a population of 2.7 million and a growth rate of 2.1% in 2007 (CSA 2007)¹. The city with its ever-increasing population faces various challenges of urbanization such as high level of unemployment, housing shortage, congested living conditions in slums and inadequate sanitation.

Addis Ababa is largely characterized by low provision of infrastructure, poverty, limited housing development, high illiteracy and high unemployment. A large percentage of the urban population is living in overcrowded housing that lacks basic services such as potable water, electricity and sanitation. Many inhabitants live in conditions, which do not meet minimum standards of living, (UN-HABITAT 2011a).

A high increase in urbanization accompanied by poverty and housing shortage hinders the city development. In the year 2004, the City government as major mitigation measure to address the problems of housing and poverty launched a strategic plan: the Addis Ababa Integrated Housing Development Program (AAIHDP). The program is a government-led and financed housing provision program for low and middle income households in Addis Ababa (UN-HABITAT 2011a). To implement the program the Addis Ababa city government established a development plan to construct 50,000 housing units annually and 150,000-200,000 housing units within the five-year period from 2004 to 2009 (AAHDPO 2006). As of mid-2010, 80,257 housing units were built in different sub-cities of Addis Ababa.

1.2 Background

1.2.1 Housing condition in Addis Ababa

In recent years, urbanization has attained unprecedented levels of growth with the development and expansion of the city. Housing condition in Addis Ababa is very poor where 85% of housing structures are dilapidated and need either significant upgrading or demolishing (GTZ-IS/ Ethiopia 2005). Most houses in Addis Ababa are either 'kebele houses' or privately owned houses. Kebele houses are single storey public houses provided 30 years ago and administered by lowest level of the city government. The houses had never been maintained because the rental price is too low to cover its maintenance cost nor budget is allocated for maintenance. The study made by AAHA in

¹ Now it is thought to be 4 million (UN- HABITAT 2011a)

2003 reveals that out of the total houses in Addis Ababa 76% of 'Kebele' houses, which account for 47% of the total housing stocks are very old, very dilapidated, and highly congested in which infrastructure is overloaded or in deficit. The same study revealed that out of the total houses in Addis Ababa 31% of the houses are single room, 25% of the houses have no toilet facilities, 26% of the houses has no kitchen, 75% of the houses are constructed from mud and many houses have no private electricity and water connections (AAHA 2012).

In 2000 the informal settlements accounted for 20% (60,000 squatters) of the city's housing stock which are classified as a spontaneous settlement in the inner city, regular residential area with informal housing development and peripheral spontaneous settlements (UN-HABITAT 2011a). Currently the housing deficit is estimated to be 380,000 units (AAHA 2012). As a result, residents resort to live in slum area or settle informally to access housing and are subjected to high rent.

To tackle housing and poverty problems AACA launched a program called Addis Ababa Integrated Housing Development Program (AAIHDP). It is an integrated approach on one hand to ease housing shortage and on the other hand to alleviate poverty through provision of low cost housing and creating employment opportunity for the urban youths. The next sub-section will present a brief description of the program followed by explanation of technical manual (guideline for the construction process) and the stakeholders who are involved in the project.

1.2.2 Addis Ababa Integrated Housing Development Program, (AAIHDP)

Addis Ababa Integrated Housing Development Program was inaugurated after successful completion of 'Bole Gerji pilot apartment's construction conducted in the years 1999-2002. Low cost housing project was established based on bilateral agreement between Ethiopian and German governments to provide technical, managerial and financial support. German Agency for Technical Cooperation- International Services (GTZ- IS) was delegated to support the program in technical and managerial aspects whereas KfW and DEG provided financial support (GTZ-IS 2005). By using low cost technology, GTZ- IS in collaboration with the Ethiopian Ministry of Federal Affairs carried out the first pilot project in Addis Ababa. In this project, viable and technically sound construction solutions on the basis of pre-fabricated building elements were introduced.

During the construction process on the job training and micro and small scale enterprise's promotion took place. Accordingly, in the construction site, daily 2500 workers had been employed, 750 workers participated in Hollow Concrete Blocks (HCB) production at production site and 86 micro and small enterprises were engaged in production of metal doors and windows. In addition, a number of specialized micro and small enterprises were engaged in electric and sanitary installation (GTZ-IS 2005). The project only took eight months to construct 28 buildings with 700 housing units. After successful completion of the pilot project, the municipality adapted this low cost housing development program to implement it in different parts of the city with different implementation phases and GTZ- IS continued to be technical advisor (UN-HABITAT 2011a).

Following low cost housing development program, the City Government in 2004 launched a strategic plan, Addis Ababa Housing Development Program (AAIHDP) with multi-sector goals of providing integrated, affordable and low cost housing, empowering urban residents through property ownership, job creation and income generation, improvement of the quality of the urban environment, infrastructure development, and urban renewal.

A rationale is derived from the Millennium Development Goal (MDGs) with the program aimed at decreasing poverty by 50%, decreasing slum by 50% by 2020 and provide access to sanitation. The specific objective is to construct 50,000 low cost housing units per year for low and middle income households, and to create employment opportunity to the urban youth (estimated to create 40,000 jobs) and to employ 1500 MSEs (GTZ-IS 2005).

The program received recognition by the federal government immediately after its inception. According to UN-HABITAT (2011a), the reason is that the approach was large scale, pro-poor, advocating slum prevention and access to home ownership. The approach also had integrated housing and economic development. The program has different phases of implementation and provides a window for review every five years. After intervention by the federal government, the project was duplicated in every sub city of Addis Ababa (as shown in the map below) with a total 100 construction sites.

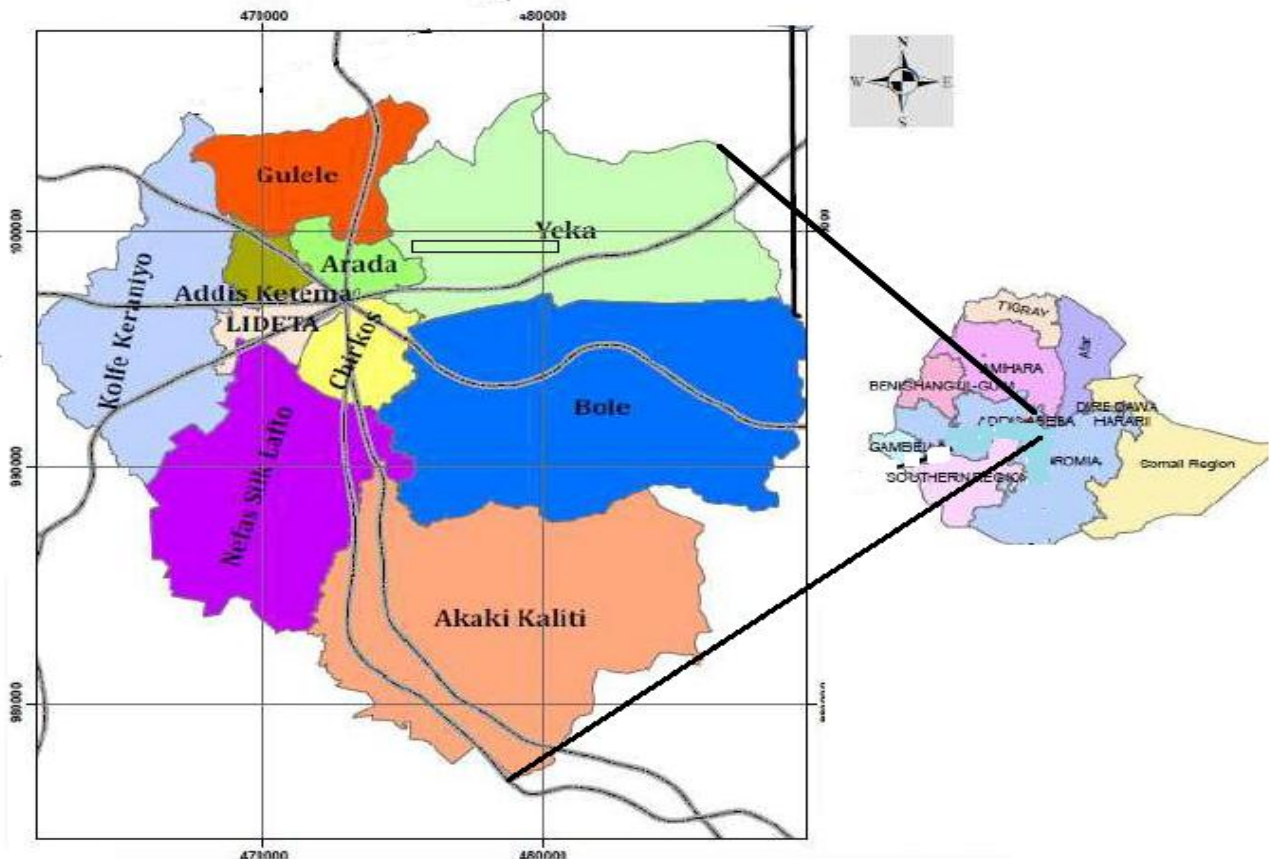


Figure 1: Location of sub-cities in Addis Ababa municipality, Ethiopia

(Source: Office for the Revision of the Addis Ababa Master Plan (ORAAMP), 2002)

Currently the selling price of the house on average is 1571 ETB (72 EURO) per m², which is 40% lower than the free market price (AAHDPO 2012). To meet its main objective of affordability and employment creation, the program adapted low cost technology through alternative construction methodologies (use of prefabricated building component), lowered the building standards to acceptable standard for low cost housing and use of monotonous building typology and mass construction (GTZ-IS 2005). The program also promoted the participation of small-scale contractors and MSEs. A small - scale contractor is broadly defined as one with limited capital

investment, who may need financial and managerial support to effectively run their business, (Sibanda 1999, pp.8). In Ethiopian context small-scale contractors are those whose capacity in relation to financial, human and equipment place them in grade 6-9. MSEs are established by urban youth who are recruited, trained and get financial and technical support from the program to manufacture and provide prefabricated building components and to execute some installation works of the buildings.

The program is administered and managed by the Housing Development Project Office (HDPO) (UN-HABITAT 2011a). The financial sources are Bank loan, city budget and down payments from beneficiaries of the project. The independent financial source of housing program is the Commercial Bank of Ethiopia (CBE), which provides funding directly to HDPO through the purchase of bonds. Moreover, the Bank provides loan service to the beneficiaries that cover 80% of the total cost of a housing unit. Up to 2011, the CBE has provided loan amounts of 3 billion ETB (Ethiopian Birr) or 178 million Euros to HDPO and 1.7 billion ETB or 100 million Euros to the beneficiaries (UN-HABITAT 2011a). Besides the mentioned financial sources, the government subsidizes the project through VAT (15%) exemption on imported building materials and machinery, and lease profit exemption on land. The government allocated direct loan of 2 billion ETB (118 million Euros) to the construction companies to subsidize imports of heavy machineries for the construction of the houses.

AAIHDP incorporated various governmental institutions for directing, managing, implementing, and supporting the program. Private sector enterprises participated in designing phase, in supplying constructing materials and in the actual construction works (UN-HABITAT 2011a). Ministry of Works and Urban Development (MWUD) is the owner of the project and there are also partners on regional and local level, (GTZ-IS/ Ethiopia 2003). The institutional framework is illustrated in figure 2. The program also outlined condominium regulations, building standards and beneficiary eligibility regulations (Proclamation Number 172/2002, 272/2002, 370-2003, 79/2005, 15-2004).

The project has an overall impact on stimulating the economy by enhancing the construction industry through mass construction of buildings, introducing new technology, capacity building of contractors (financial and technical support), creating skilled and semi-skilled professionals and MSEs (GTZ-IS 2005). The city also benefits from generation of additional income from taxes and related fees; an increase in efficiency and effectiveness of urban service provision and achievement of political stability. Moreover, by promoting MSEs, young and active generation are utilized and employment opportunities are created (UN-HABITAT 2011).

The program improves the living standards of residents and reduces slums. The project also has increased the income of the urban beneficiaries as they rent out houses as an alternative source of income and stabilized the housing market by reducing the construction cost by one half of the market value. Overall, the project would help the country achieve the millennium development goal in the area of housing and better services (UN-HABITAT 2011).

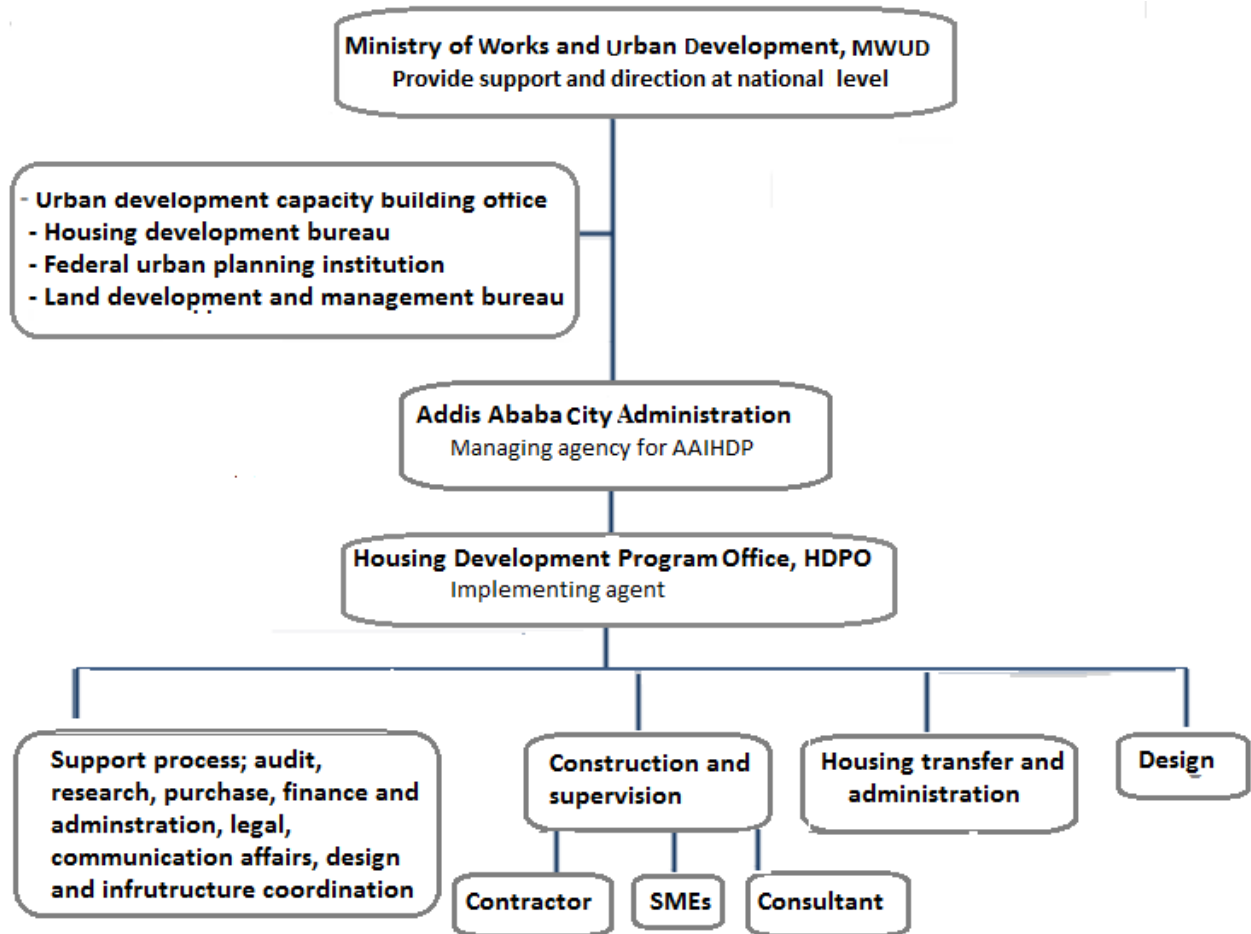


Figure 2: AAIHDP institutional framework.

(Source: GTZ-IS/ Ethiopia 2003, UN-HABITAT 2011a)

1.2.3 Technical Manual - AAIHDP

GTZ-IS in collaboration with MH Engineering Consulting Engineers P.L.C. (Advisor of the program) and the Ethiopian Ministry of Federal Affairs prepared technical manuals to be used as a guideline during the implementation phase of the program. Volume I of the technical manual describes a modular building system introduced by the Low-Cost Housing Project. It has four parts the first part describes machines and special tools for the pre-fabrication process and simple handicraft-techniques, the second part introduces modular system - measurement basics and the standardized building parts. The third part visualizes a typical building process based on a model to illustrate the order in which the building parts should be assembled. The fourth part consists of models of condominium buildings (GTZ-IS/ETHIOPIA 2003).

Volume II is a continuation of the first technical manual published with the objective to inform the development of low-cost housing in Ethiopia. Furthermore, the manual includes a construction guideline “step by step” meant to guide site supervisors and site engineers to organize construction sites and control the quality as well as the implementation of the technical requirements. It is a very practical guide, which includes checklists for the different tasks that need to be accomplished. It goes through the whole construction process from excavation, earthwork to slab construction (GTZ-IS/ETHIOPIA 2005).

The overall target groups for both manuals are architects, engineers, construction contractors, site supervisors and foremen, bilateral and multinational development agencies and politicians who want to improve urban centres in Ethiopia (GTZ-IS/ETHIOPIA 2003; GTZ-IS/ETHIOPIA 2005).

1.2.4 Stakeholders involved in the actual construction

The main stakeholders who are involved during the construction phase are consultants, small-scale contractors and small and micro scale enterprises, MSEs. The consultants give advisory services and supervise the whole of the work and the small-scale contractors are the general contractors who are responsible for major construction activities. MSEs are the other stakeholders, who manufacture and provide prefabricated building components, install electrical and sanitary works, and manufactures metal window and door frames.

1.3 Problem statement

Many researches have been undertaken to assess and evaluate the implementation of the AAIHDP, mainly focused on its contribution towards employment opportunity, on addressing housing shortages and slum reduction. Criticism has also made on the un-affordability of the houses to low-income residents, for lack of clear and updated compensation and relocation schemes, and its inability to network the urban poor to access loans from financial institutions to make the down payments to purchase the houses.

There are also concerns over quality and life span of the buildings; in particular the quality of structures, construction finishing and infrastructure. UN-HABITAT in its 2011 report pointed out that management of specific issues like location, built environment design, and construction quality are unanticipated challenges of the program. The same report expressed that if not addressed properly, the mentioned challenges might jeopardize the long-term success of the program.

Thus it is necessary to identify causes of poor performance which contribute to low quality housing in relation to physical aspects such as structural failure, wall cracking, and sanitary and electrical installation problems. Construction or design faults are the main factors, which contribute to low quality construction. Construction fault may be a result of poor workmanship, poor quality material, and lack of technical know-how, lack of commitment, lack of stakeholders' cooperation and etc.

Despite the buildings being built in a manner to minimize major repair and maintenance costs for the next ten years, and the program's effort not to compromise quality and stability of the buildings (GTZ-IS/ETHIOPIA 2005), major construction defects have been observed over the completed condominium housing units. Thus, households subjected to unexpected maintenance costs after handing over the houses.

This study intends to address issues of the project specifically focusing on construction performance. Who is liable for quality defects of structures? Larger responsibility falls on the general contractors and MSEs because they are the key players in the actual process of construction and material provision.

1.4 Research Objectives

Main objective

The main objective of this research is to identify why small-scale contractors and MSEs struggle to deliver good quality houses despite the AAIHDP's efforts to promote them and to draw conclusions about what needs to be improved for them to be able to improve their performance. It proposes a set of criteria to be used as a basis for a quality improvement framework, which will provide project managers and owners with the required information and strategic direction to achieve their own and their stakeholders' targets for implementation of quality practices leading to the achievement of improved quality outcomes on future projects.

Specific Objective

- Examine the factors which lead to poor performance of Small scale contractors and MSEs during the construction process
- Examine the program's support and its effect on the performance of Small scale contractors and MSEs
- Identify defects related to poor performance during construction

1.5 Significance of the study

The housing shortage in Addis Ababa is significant. Housing delivery is heavily dependent on AAIHDP, which despite being a reliable source for low cost housing supply, has generated employment opportunity and job creations for thousands of youths in the city.

Identifying causes that lead to poor performance of small-scale contractors and MSEs will help the program to identify its weak sides, which hinder achievement of its goal on supplying quality houses. Moreover, as construction industry has an enormous impact on economic development, improving performance of the project parties will have an impact on improving the sector, which in turn affects the economy of the country positively. As AAIHDP is a continual program designed to provide housing at large scale, exploring its limitation at an early stage will prevent the program from delivering less quality houses in the future. This will further help the program to meet its goal of delivering affordable and quality houses at the same time improving the capacity and competency of small-scale contractor and MSEs.

It is hoped that this study will increase awareness of the program in quality defects. Then if corrective measures are taken, it will ensure sustainability of the program in delivering quality low cost houses in Addis Ababa. Moreover, this study could also contribute solutions to similar undergoing programmed in the country as a whole. The result of the study also anticipated to be positive, but if not then, another study will be necessary to explore possible sources of defects in construction of condominium houses.

1.6 Scope and limitations

The study examined the causes for poor performance of small-scale contractors and MSEs that result quality defects in construction of condominium houses in Addis Ababa. This research mainly focused on quality issue related to defects of construction. It envisages construction defects in association with the performance of small-scale contractor and MSEs. This involves revealing the

constraints that the small-scale contractor and MSEs facing during the construction process, examining the program support and the impact in their capability to carry out their tasks. Furthermore, the research detects the defects observed on the already finished and handed over condominium houses, suggest solutions and approaches to addressing problems, and thereby lessen the defects in the construction process.

There are several limitations to the study. Firstly, the research population is too large to cover in the limited time given thus sampling is required which might have an impact on the general output of the study Secondly, since the program has political implications, the issue of defects might not be sound for the HDPO officials thus they might be reserved to cooperate with this study. Thirdly, because of the rainy season in Addis Ababa the project was not active by the time fieldwork conducted, therefore, it was difficult to find all respondents on site and was mandatory to look for them in different places.

The last but important limitation was a language problem. Since most of the survey made using local language translations of the entire questionnaire was necessary. While doing so sometimes it was too difficult to get the appropriate word in the local language. To transcribe the data collected, it again needed to translate back the interview results to English.

Chapter 2: Literature Review

2.1 Introduction

This chapter focuses on the general overview of contractor performance and Micro and Small Scale Enterprises (MSEs) support, construction industry development, components of low cost housing technology and prefabricated building components. In addition, it tries to set a comprehensive understanding of some of the theoretical concepts and factors, which contributes to the poor performance of building construction.

Prior to reviewing the quality issue of the project, the first part discusses about the general overview, practice and problems of the construction industry and the second part describes the types of housing especially low cost housing, prefabrication technology and affordability. This is important to have an understanding about the type of houses AAHA constructing and the technology the program adapts.

To attribute the reasons for quality defects in construction the third part of this chapter deals with project performance issues. The first section discusses poor construction performance, causes and effects, and analyse factors that contribute to poor performance. Also, address quality issues and stakeholder involvement in building construction. These specific sections together with sections dealing with contractor performance helps to provide academic ground to base the research's objective. A conceptual framework is then built after summarizing the literature review.

2.2 Construction industry development

The construction sector is characterised by many small enterprises and high labour intensity; it is also highly dependent on public regulations and public investments. Many authors agree on the impact of the construction industry on the economic development of a country. Wells (1984) stated that construction is an activity that plays a very vital role in the process of economic growth. Moavenzadeh (1987) adds that construction has positive effects on the economy of a country by increasing GDP and employment. In Ethiopia, the construction industry contributed about 5.6% to the national GNI in 2006/2007 (AfDB/OECD 2008).

Research on construction industry development and the effort to implement its findings have broad aim of solving the problems facing the construction industries of developing countries. Many international organizations such as Swedish International Aid Agency, Norwegian Overseas Aid Agency, UN Industrial Development organization, UN- Habitat, World Bank have shown interest and conducted studies on construction industry development (Ofori 1994). The studies mainly focus on identifying problems the construction industry is facing and propose improvements for the problem identified. In addition, the studies comprise technological changes the construction industry adapts in developing countries.

The technological changes observed are mainly appropriateness and mix of technologies, selection of methodologies using the nation's particular circumstances and need of support of several sectors of the economy. Financial assistance schemes, distribution centres, supply credit terms to help construction enterprises and improvement in effectiveness of the dissemination of construction technology are some of the changes identified in the financial status of the construction industry. Finally there are changes on technical support like design guides on each developed material or

technique and professional development courses that clearly explain technical aspects for the benefit of small producers (building materials) and contractors.

The construction industry in all developing countries should improve. Many writers state that governments are responsible for the construction industry development however; Ofori (1994) argues that not only government but also construction enterprises and practitioners can contribute to efforts to improve the industry. He suggested two improvement areas one is the need of continual reviewing of building regulations and standards drafted in the form of technical aids rather than restrictive rules and in a language appropriate to the educational background of the majority of the users. The other is the need of construction enterprises to improve their productivity, efficiency, quality of work and innovation as corporate objectives, and set up appropriate organizational structures to achieve them. Ofori (1994) also states that improvement areas the governments can play are formulating national strategies, policies, administering, and improvement of national capacity in conventional technologies in most cases, prefabrication and industrialized buildings.

Development activities include material development, human resource development, contract document development, contractor development, technology development and institution building (upgrading and expansion of micro-units and cooperatives) (Ofori 1994). In general, the practice of construction industry development mainly related to enabling approach of the process; governments shall improve their enabling approach to the industry and enterprises shall improve their productivity for the overall improvement of the construction industry.

2.2.1 Contractors' performance and development Programs

Contractor performance has a direct impact on project performance for instance poor contractors' performance can lead to poor project performance. From the SWOT analysis made in European construction sector low productivity, little interest in education and training among small construction companies, and SMEs lack of marketing skills (ICT and management skills) are among the identified weaknesses in the construction sector (Jankovichova 2010).

The other factor that negatively affects contractor performance is that contractors are not customer oriented and focused, service and quality seems to be ignored. Contractors can be rated in terms of various aspects such as management, claims orientated, site offices, safety, relations with site neighbours, plant and equipment condition, administration, worker skill, and quality (Latham, 1994). Latham further added factors that negatively affect contractors' performance in terms of quality for instance workers' skills, out of sequence work, late information, emphasis on production, project duration, poor specification, design change, employer change, bad weather, and late information and procurement system.

Due to the above constraints, it is difficult for the contractor to deliver quality production, which then affects the construction sector as a whole. These attract international organizations to develop improvement program, as the construction sector is important to economic development since it comprises a wide variety of activities, products and actors. Krooden, Milne & Atkins (1995) underline the importance of contractor development program to overcome poor workmanship and maximize development impact on projects in poor communities. Thus, development programs have to consider management options that encourage development, institutional roles that ensure coordination and project success and project options that match the project with development objectives (Krooden, Milne & Atkins 1995).

The programs established have to be people focused and satisfy developmental objectives over the creation of physical assets such as socio-economic benefit, which include job creation, entrepreneurial development and increased economic activities (Krooden, Milne & Atkins 1995). Hence, in line with these objectives and in response to the challenge of unemployment, underdevelopment and poverty in developing countries, International Labour Office (ILO) has formulated guidelines, which deals with labour-based contractor development projects.

Most of the contractor development programs include training and capacity building schemes where the level of the support, depends on the level of the contractors (Krooden, Milne & Atkins 1995). The Less developed contractor will have broader needs of technical and managerial aspects. Training is a vital part of the development program that should be given immediately before a project starts to enable the contractor to perform well and be competent. Training is provided either by manpower upgrading programs or NGOs and should focus on technical competence, business and managerial skills and program management (Krooden, Milne & Atkins 1995).

Different countries design different developmental programs depending on their context. To learn more about developmental activities, the three boxes below present programs of developmental activities experienced in three different developing countries. The programs in each of the three countries are set for development of small-scale contractor and focuses on improving their performance.

Box 1: Contractor development programs – Senegal

An independent contract management agency

AGETIP is non-profit contract management agencies in Senegal established in 1989 as a private non-profit NGO. The objectives of the agencies are creating employment, particularly in urban areas; providing vocational training to improve the operational efficiency of the local construction industry and the effectiveness of public institutions; demonstrating the scope for increased application of employment-intensive construction technologies; and executing public works that are worthwhile both economically and socially.

AGETIP has been given the mission of owner's delegate for a program of small and medium-sized labour-based public works and therefore manages every aspect of the project including inspection. The agency contracts small-scale contractors directly to execute civil works following strict contractual procedures described in a manual approved by the Government and the World Bank.

It also contracts local consultants - to prepare designs and bidding documents and to supervise works - in order to keep its own staff to a minimum. AGETIP is responsible to a Board in which the government, local municipalities, unions, NGOs and other development actors are represented.

Source: Bentall, Beusch & Veen (1999)

Box 2: Contractor development programs - South Africa

Development team approach

The existence of experienced consulting and contracting firms in South Africa has made it possible for them to play an active role in small contractor development. Experienced and suitably qualified personnel of such firms - who together form the development team - assist small contractors in the following areas: administration and management technical training engagement of specialist contractors.

The contractor-trainee signs a contract with the contracting agency and the development team is appointed by the contracting agency on a fee or cost-reimbursable basis. This team comprises design engineer, engineer in charge of works, construction manager (construction management, orientation, advice, training and provision of equipment), materials manager (procurement, storage and distribution of materials), and procurement agent (handles the supply of materials and equipment). A different level of support is provided to contractors in their different stages of development.

The types of supports for each level of contractor were construction and materials managers. The program cover contractors who engaged into all range of contractual responsibility from only provision of labour, small tools, transport materials, provide certain materials, site office, and certain storage facilities to provision of site office, certain storage facilities, and all materials and plant.

Source: Bentall, Beusch & Veen (1999)

Box 3: Contractor development programs –Vanuatu

An integrated approach to capacity building for the private and public sectors

Following a massive destruction of housing and infrastructure caused by a cyclone in 1987, emergency assistance was provided to the Pacific Island of Vanuatu, but at the same time, a capacity building effort was initiated to cater for the long-term needs of the construction industry.

The capacity building project included: (i) institution building through courses, practical training and mentoring public works supervisors, and the establishment of improved procurement and stores organization;

(ii) Contractor development through the creation and implementation of modular courses and comprehensive training and assistance packages for 20 small firms;

(iii) Vocational training through capacity strengthening of the vocational training centre and direct training in skills such as carpentry and electrical wiring;

(iv) Improved housing construction technology dissemination; and

(v) Feasibility studies and design related to infrastructure reconstruction in different sectors.

The project was very successful in achieving its short-term objectives, but a subsequent evaluation mission noted that the absence of longer-term support to enable the domestic contractors to become firmly established jeopardized the sustainability of the results.

Source: Bentall, Beusch & Veen (1999)

2.2.2 Small and Medium Enterprises (SMEs)

“An enterprise is considered to be any entity engaged in an economic activity, irrespective of its legal form. This includes, in particular, self-employed persons and family businesses engaged in craft or other activities, and partnerships or associations regularly engaged in an economic activity” (EU 2003, Annex: Article PP.39).

"SME" stands for small and medium-sized enterprises or micro and small-sized enterprises. A generic definition is not easy to find; any definition or classification of SMEs can only be considered particular to the country in question. Its description is depends largely on local conditions of each country. South Africa for instance names the enterprise as SMMEs, which stands for small, medium, and micro enterprises and Hungary name the enterprise as SMEs to refer the

same. United States on the other hand use the name SMEs to refer small and minority business program (UNCTAD/WTO). Clear description of the name MSEs is not yet defined in Ethiopia, both MSEs and SMEs has been used interchangeably to refer to small and micro scale enterprises. Sometimes MSE is used to refer to micro and small-scale enterprise, while SME used to refer to small and medium scale enterprise, and MSME used to refer medium small and micro enterprise, (DWCP 2009).

The criteria for determining SMEs are also different for different countries. For instance in India, the criteria for determining SME status is based on investment, while in South Africa SME eligibility depends on the number of employees and turnover. Similarly, in Ethiopia, the working definition of MSEs is based on capital and labour. However there are three parameters that are generally accepted when defining SMEs in most countries; number of workers employed, which is the most widely used criteria, firm's level of capital investment or of assets, and firm's volume of production or annual turnover (UNCTAD/WTO).

EU classifies micro, small and medium-sized enterprises - SMEs based on staff head count and financial ceilings accordingly (EU 2003);

1. A medium enterprise is defined as an enterprise which employ fewer than 250 persons and have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet not exceeding EUR 43 million.
2. A small enterprise is defined as an enterprise which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet does not exceed EUR 10 million.
3. A microenterprise is defined as an enterprise which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet does not exceed EUR 2 million.

According to Ethiopian development strategy 2011, MSEs are categorize as follow: enterprise with capital below Euros 2,300 or Birr 50,000 and have less than 5 employees considered as micro enterprise and enterprise with capital below Euros 70,000 or Birr 1,500,000 and have 6-30 employees considered as small enterprise.

2.2.3 SMEs' supporting program

Because of its benefit to the economy, governments of different countries have been undertaking SME development activities. However, the emphasis may not only be on economics but also other normative goals like political stability, social cohesion, remediation of racial discrimination, cultural pluralism, fair distribution of wealth, rapid increase in employment potential and balanced regional growth. For instance, assistance to SMEs in United States and South Africa was based on immediate racial discrimination and on the other hand in India SMEs program are viewed as a means of creating employment opportunities and remove the disparity in growth of various regions. Similarly, SMEs promotion in Ethiopia is also emphasizing on poverty reduction through employment creation. Thus, the issue associated SME development may not be explicitly economic but may have political, social and emotional overtones (UNCTAD/WTO 1999).

SMEs have the potential to become significant exporters, to promote economic growth, and to alleviate poverty among various group in a society (Badrinath & Kirpal 1997). Moreover study on the SMEs' impact on the EU labour market reveal that 85% of net new jobs in the EU between 2002 and 2010 were created by small and medium sized enterprises which resulted in net employment in the EU's business economy to rise substantially (an average of 1.1 million new jobs each year) (EIM 2011). Recognizing the benefit of SMEs and understanding the need to assist them

UNCTAD/WTO 1999 prepared guidelines, which serve a multitude of purpose in developing countries:

- To assist government in understanding how to structure and implement SME programs in public procurement.
- To provide information to industry associations and chambers of commerce so that they may more effectively work with government and industry to assist SMEs.
- To serve as a training tool during the public procurement process
- To extend the current levels of understanding of the public procurement program to develop needed business and production skills in SMEs in order to make them more competitive.

2.2.4 Low Cost Housing

There has been considerable debate over definition of low cost housing. Lewale (2011) specify the existence of huge misconception on low cost housing. He asserts that people think low cost housing is only suitable for substandard works constructed by utilizing cheap building materials of lower quality. Tam (2011) adds that low cost houses are designed and constructed as any other houses with regard to foundation, structure and strength. However, low-cost housing adopts cost reduction approaches.

Cost reduction is achieved through proper management of resources, postponing finishing works and the use of locally available materials along with improved skills and technologies without sacrificing the strength, performance and life of the structure (Lewale 2011 & Kumar 1999). Low cost housing technologies aim to cut down construction cost by using alternatives to the conventional methods and inputs; usage of local and indigenous building materials, local skills, energy saver and environment-friendly options. Strength and durability of the structure, stability, safety and mental satisfaction are factors that assume top priority during cost reduction. In a study made in India, using low cost housing technologies can save construction cost of walling and roofing by 26.11% and 22.68% compared to the traditional construction methods. This indicates that using low cost housing technologies is a cost effective construction approach for the industry (Tam 2011). For instance in the case of Addis Ababa, cost efficiency is achieved through mass production of condominium houses, use of local skills and mostly by using prefabricated building components manufactured by man power specifically MSEs, (GTZ-IS 2003).

Lewale (2011) also points out areas where cost can be minimized: to reduce plinth area by using thinner wall concept, use locally available material in an innovative form like soil cement blocks in place of burnt brick, and use energy efficient materials that consume less energy like concrete block instead of burnt brick. Additionally use environmentally friendly materials that are substituted for conventional building components, pre-plan every component of a house and rationalize the design procedure for reducing the size of the component in the building have an effect to reduce construction cost.

Thus, cost-effective and alternative construction technologies reduce construction cost by reducing quantity of building materials through improved and innovative techniques. Apart from reducing construction cost the technology can play a great role in providing better housing methods and protecting the environment. Building material accounts for 60-70% of the total building cost (Lewale 2011). Therefore, reducing material cost results in a vital change in the overall construction cost. Tam (2011) affirms that cost-effective construction technologies do not compromise with safety and security of the buildings and mostly follow the prevailing building code. However, adjustment of building code might be necessary to reduce construction cost.

Moavenzadeh (1987) for instance suggested that certain standards could be forgone during low-cost housing construction, as using high-grade building material may not be appropriate in local context. Requirement for imported goods and skilled workers, substitution of materials that meets the specification and reduction of design requirement are among the suggested actions that can change. Besides, as standards become more reasonable, small-scale firms will be in a better position to satisfy them (Moavenzadeh 1987).

To sum-up, low cost housing is designed and constructed as any other houses concerning quality and strength. The main difference as identified by the authors above is its aim to cut down construction costs by adapting alternative conventional methods. Thus, cost reduction during low cost housing technology can be achieved through:

- Proper resources management
- Postponing finishing work
- Use of locally available building material
- Use of local skill
- Reduce plinth area
- Use of energy saver construction material
- Use of environmentally friendly construction material
- Adjustment of building code

Cost reduction in low cost housing is mainly achieved through cost reduction related to the material cost because the material cost comprises the majority of the construction cost. Besides, usage of prefabricated building component largely reduce material cost thus adapting these building components to low cost housing technology is vital. The next section will discuss prefabricated building technology, as the methodology is also adapted in the construction of low cost houses in Addis Ababa.

Low cost housing supply also has certain constraints (Moavenzadeh 1987). Financial problems due to late payment and withholding portion of payment as form of guarantee, high cost of equipment and unavailability of access to credit are the main ones. The problems are worse for small-scale contractors in developing countries. They face idleness of equipment due to unavailability of consistent work, transportation of building components, lack of technicians and supplies for spare part of equipment, inefficiency of equipment, and inadequate supply of skilled construction labour. Moavenzadeh (1987) also suggests remedial action to the specified constraints. Timely payment, upon arrival or even in advance payment for material and facilitate access to the loan are remedial actions associated with finance. Remedial actions concerning technical support for contractors include, training workers for the construction and building materials industries- especially crafts people, managers, engineers and other professionals and apprenticeship systems for skilled workers and managers, which remains the best bet for mitigating shortage of technical and managerial talent. In addition, incorporate workers in the informal sector since they are already experienced in the manufacturing, use of domestic materials and the construction of low cost housing. Any program to improve the housing conditions of the poor would profit by their inclusions. At last, policies that favour small-scale production and institutional mechanisms will not only promote the social and economic welfare of the poor but also generate growth and employment in nearly all sectors of a developing nation (Moavenzadeh 1987).

Overall, there are two key points discussed in the above paragraphs concerning bottlenecks of low cost housing construction process. One is the constraints during low cost housing construction and

the other is supporting schemes to alleviate such constraints. Summary of both points is presented below.

The main constraints of low cost housing supply are:

- Financing, (late payment, unavailability of credit)
- Idleness of equipment
- Transportation of building components
- Lack of repairmen and supplies for equipment
- Equipment inefficiency
- Inadequate supply of skilled workers
- Shortage of technical and managerial talent

Some remedial measures suggested by Moavenzadeh (1987) are:

- Timely payment
- Facilitate access to credit
- Give Training to workers
- Apprenticeship system for skilled workers
- Incorporate workers from the informal sector
- Enabling policies that favour small-scale production

From the constraints and remedial actions mentioned above it is clear that most of the problems are associated with the contractor. The suggested remedial measures also imply that a contractor participating in low cost construction has limited capacity, thus need financial, technical and administrative support.

2.2.5 Prefabricated Building technology

Prefabrication defines as a manufacturing process, generally taking place at a specialized facility, in which various materials are joined to form a component part of a final installation (Tatum et al 1987). The techniques for prefabrication were established in the United Kingdom immediately after World War I. It was used to replace large housing stock destroyed during the war and to provide housing for soldiers who got back from war. This housing technology was treated as a means to provide temporary quality housing cheaply and quickly. It was also favoured because it uses less skilled labour. The houses were single detached houses and the building components were manufactured in factories and later assembled on site (Waskett 2003).

From a comparable study of different construction methodologies made in Thailand (Scott 1980), India (Lal 1995) et Canada (Friedman & Cammalleri 1997), using prefabricate method of construction is found to be the cheapest. The sensitivity analysis made by differing all unit costs and production rate, also shows material cost is the most sensitive of various construction costs, (Scott 1980). However, this prefabrication method requires technical knowledge, large initial investment, good organizing and management (Scott 1980). Prefabricated building materials are building components that are manufactured off site and shipped later to assemble at the project location (Lal 1995). In India, prefabrication technology is increasingly being adapted for large-scale housing programs (Lal 1995). Some of the common and widely used form of building and civil engineering prefabricated building materials are concrete and steel section such as columns, beams, HCB for Slabs and walls, metal doors and windows (Lal 1995, Friedman & Cammalleri 1997).

The detailed procedures and usage of building components are different for each country depending on the nation's particular circumstances. For instance in the UK it was developed based on the problem the country faced after the war which was the need to provide a quite large number of housing stock in a short time with the limited budget and scarce skilled manpower. Thus, they managed to manufacture building components in a factory level that avoided the need of a large task force. This methodology of manufacturing building component at factory level spread out and attributed to the high percentage of housing provision in the United States, Sweden and Japan (Friedman & Cammalleri 1997).

Nevertheless, in a country like Ethiopia where the labour force is abundant and cheap the technology is adapted differently. The building components for the construction of low cost housing are manufactured and supplied by MSEs who are trained and supported by AAIHDP. Therefore, the program adopts a labour-intensive prefabrication methodology rather than equipment intensive.

Listed below are the advantages and disadvantages of prefabricated housing technology based on factory manufactured building components (Waskett 2003, Friedman & Cammalleri 1997, Lal 1995, Carl et al. 2000 & Tatum et al 1987).

Advantages;

- Reduces on-site construction and congestion
- Higher quality product and reduction in defect at completion
- Total construction time is reduced
- Quality control can be easier in a factory assembly line setting
- Time spent in bad weather at the construction site is minimized
- Less waste
- The need for formwork and scaffolding is greatly reduced
- Pouring concrete sections in a factory brings the advantages of being able to re-use molds
- Concrete can be mixed on the spot without having to be transported
- Prefabricating steel sections reduces on-site cutting and welding costs as well as the associated hazards
- Potential for water recycling
- Numerous potential environmental benefits
- Improved productivity and profitability for contractors

Disadvantages;

- Careful handling of prefabricated components
- Lack design and dimension flexibility
- Transportation costs may be higher for prefabricated sections than the raw material
- Attention has to be paid to the strength and corrosion-resistance of the joining of prefabricated sections to avoid failure of the joint
- Leaks can form in the joints of prefabricated components.
- Large prefabricated sections are difficult to move and require heavy-duty cranes
- Form large group of monotonous building results from using the same type of prefabricated elements

The practice of using prefabrication in many countries for instance the United States, Hong Kong, Thailand, and India construction industries is described as a successful experience (Tatum et al 1987). In general, off-site fabrication is a topic of international interest and provides an effective construction technique in terms of quality, time, cost, function, productivity and safety.

2.2.6 Affordability

UN-HABITAT (2011) demonstrates that affordable land and housing in Africa is a serious and increasing problem because of the mismatch of incomes and input required for construction. Many countries do have various programs and projects that address affordable housing implemented at country or local level such as slum upgrading, public- private partnership for housing production, and direct government low- cost housing with varying degree of success. Conception of affordability of houses is the same for most countries. Affordable housing is broadly defined as housing which is adequate in quality and location and does not cost so much in the way it prohibits its occupants meeting other basic living costs or threatens their enjoyment of basic human right (UN-HABITAT 2011b). According to Lal (1995) low cost housing is the provision of housing which caters to the minimum requirements of the masses within their income capabilities, without sacrificing the quality of the construction.

In Ethiopia like some other countries, cost efficiency of low cost housing is achieved through standardization of building elements and reducing the number of different items needed. Prefabrication and the use of machines and special tools to produce these standardized elements maximize productivity, resulting in lower costs per unit (GTZ-IS/Ethiopia 2003).

2.3 Poor construction Performance, Causes and Effects

Construction projects often suffer from poor performance in terms of time delays, cost overruns and quality defects because completion on time, within budget and with the required quality has been widely recognized as the three primary goals of project success. Meng (2011) identified time, cost and quality as major indicators to measure poor project performance. Rwelamina & Savile (1994) further divided the methods of measurement into two: traditional project performance, which measures cost, quality and time; and non-traditional performance that measures health and safety, environment, management, worker skills, industrial relations and facilities.

There are a number of factors which affect the performance of a project. Ofori (1994) identifies the reasons contributing to poor project performance as delay in obtaining statutory approval and clearance, inadequate expertise in project appraisal, planning and budgeting, and assessment of technology. Other contributing factors include lack of attention to the economy, design and material selection, delay in budgetary approval and disbursement of funds, failure to monitor progress on projects, absence of modern management techniques, inappropriate IT systems, weakness in equipment procurement, and ambiguities in relationships among agencies involved in the projects.

So far, different causes are identified as causes of poor performance in construction. Rwelamina & Savile (1994) identified a lack of management expertise and worker participation, and Tam & Harris (1996) added equipment and quality management of the team as a major cause. Atkinson (1999), Love & Li (2000), and Odeh & Battaineh (2002) further identify major causes of quality defects as human error, poor workmanship and contractual relationship respectively. Underlining on the effect of relationship management on project performance in construction, Meng (2011)

identified deterioration of the relationship between project parties or stakeholders as a major cause of poor performance.

Since construction is undertaken as teamwork, it has incorporated actors with different role and responsibilities thus, collaborative working atmosphere is required. Partnering is widely recognized as a collaborative supply chain relationship where, supply chain relationship refers to the linkage in the network of an organization (Christopher 1992). Supply chain in construction is more complex than manufacturing supply chain because it involves a larger number of key participants, such as project client, consultants, main contractor, specialist contractors, and various suppliers (Meng 2011).

Meng (2011) identified three types of relationships in construction supply chain: traditionally adversarial (TAR), short-term collaboration (STC) and long-term collaboration (LTC). TAR focuses on win-lose, suspicious, withhold and manipulate information, ineffective problem solving and unfair risk allocation (Larson 1997), according to Thomas & Thomas (2005) these leads to selfish objective, lack of trust, poor communication problem escalation and lack of continuous improvement. Thus for successful application of supply chain management, major shift from TAR to collaborative relationship is required (Egan 2002). The second and the third type of relationships are a form of partnering in which STC is project partnering focused on a single project and LTC is strategic partnering focused on multiple projects (Meng 2011).

Based on the analysis of both the traditional and the collaborative approaches within existing literature, Meng (2011) identified ten key indicators that describe supply chain relationship of a construction. The following are list of relationship indicators together with their definition provided by different authors.

Mutual objective- is shared commitment in which the interest of every party involved will be best served by concentrating on the overall success of the project (Bennett & Jayes 1995; Walter et al 2002).

Gain and pain sharing – is a risk/reward scheme that allows the parties in a construction project to share profits or cost savings and to share losses (risks) due to errors or cost increases (CIOB, 2010; Rahman & Kumaraswamy 2004).

Trust- can be defined as disposition and attitude concerning the willingness to rely upon the actions of or to be vulnerable towards another party with the potential for collaboration (Smyth et al. (2010).

No-blame culture- is a culture in which parties concentrate on finding the best possible solution instead of allocating the blame (Bennett & Peace 2006). Abandoning the blame culture helps to create an opportunity of joint working, communication, effective problem solving, risk allocation, advocate total quality management (TQM) to prevent errors in the construction process (Levitt & Samlson, 1993).

Joint working- is working atmosphere reflected by joint decision making based on a clear understanding of mutual objectives (Chan et al., 2004); joint effort for problem solving (Cheng et al., 2000); and joint effort for continuous improvement (Larson, 1997).

Communication- open communication is effective communication that facilitates the exchange of ideas and visions, which can result in fewer misunderstanding (Cheng et al., 2000) and can avoid failure in project collaborating (Ng et al. 2002). Open communication is characterized by open

exchange of information (Hong-Minh et al., 2001) and two-way communication which can maximize understanding and minimize misinterpretation (Chen & Chen 2007).

Problem solving- effectiveness in problem solving obtained by solving problems at the lowest possible level to minimize disputes (Ogunlana, 1999) and to avoid major dispute (Bennett & Jayes 1995; Jones et al. 2003).

Risk allocation- is assigning of risk to the party who is best able to manage it (Cheung 1997). It should be clearly stated in the contract to avoid later stage claim and dispute (Zaghloul & Hartman 2003).

Performance measurement and **Continuous improvement** are also among the ten indicators of supply chain relationship, and they will be discussed later in this chapter.

Based on the literature review made in this section, the identified causes and effects that lead to poor performance of a project summarized in the diagram below.

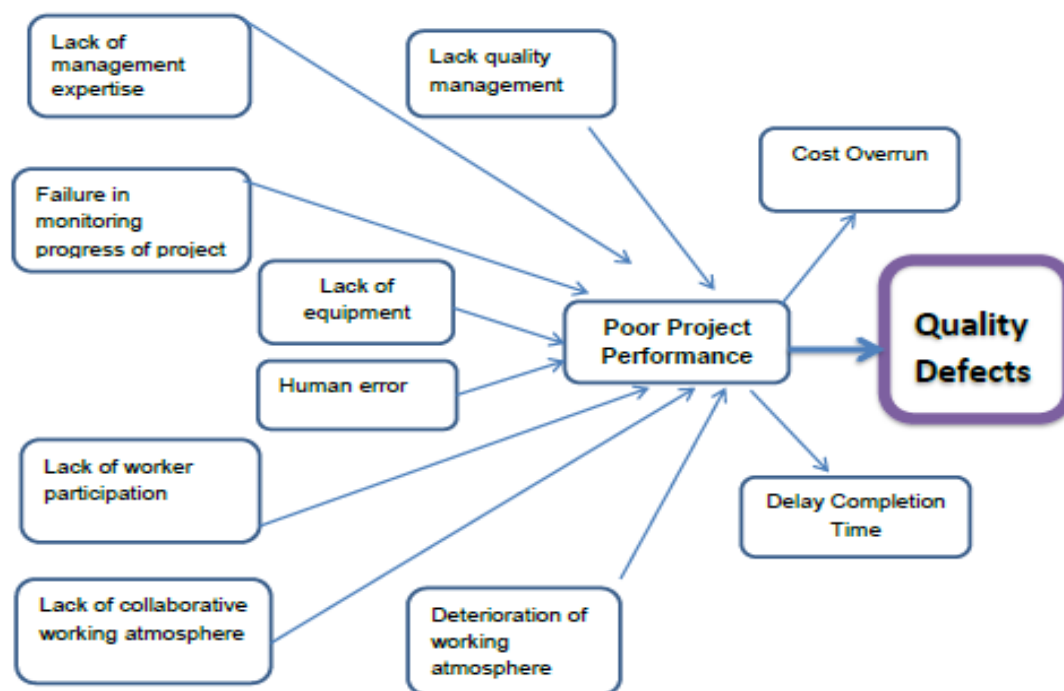


Figure 3: Causes and Effect of Poor Project Performance

(Source: Author 2012, adapted from the literature)

2.3.1 Quality practices in building projects

Although a significant amount of quality practices has been introduced within the industry, attainment of reasonable levels of quality in construction projects continues to be an on-going problem” (Heravitorbati et al. 2011, pp. 265).

Some researchers like Arditi & Gunaydin (1997) use the term quality instead of project performance to indicate the effect. Quality project refers to a project, which is completed on time within budget and meets its functional requirement (Arditi & Gunaydin 1997).

What is quality? Vincent & Joel (1995) define quality as the integration of all functions and processes to achieve continuous improvement of the quality of goods and services to meet customer satisfaction. According to Arditi & Gunaydin (1997), quality is meeting the requirements of the stakeholders: designer, contractor and regulatory agencies as well as the owner. To ensure project

quality implementation of a Total Quality Management System (TQMS) is necessary. TQMS is an effort that involves every organization in the industry to improve performance and focus on process improvement, customer and supplier involvement, teamwork, education and training to achieve customer satisfaction defect free work (Meng 2011). The system is also defined as being prescribed quality objective of the company (Oztas et al. 2005).

There are two widely used terms in TQMS namely Quality Assurance (QA) that covers activities necessary to provide quality in project work and Quality Control (QC) that is set of procedure to meet QA. The activities in QA involve establishing project related policy, system necessary to produce quality, standards, training and guidelines whereas the procedures in QC involve planning, coordinating, developing, checking, reviewing and scheduling of work (Arditi & Gunaydin 1997). The training in QA includes instruction in the basic TQM cause and effect analysis, team problem solving, interpersonal communication and interaction and cost of quality measurement (Arditi & Gunaydin 1997).

Arditi & Gunaydin (1997) also identify the importance of teamwork in the implementation of TQMS. The team, which is responsible for establishing joint goals, plans, and controls should include all members of the parties involved in the project. The teamwork provides a mechanism for listening to and communicating with the owner, thus useful for measuring the level of customer satisfaction.

As the customer's perspective of quality levels is important (Deming 1986), performance should be measured and informed to all stakeholders involved (Thomas & Thomas 2005). The next subsections then address stakeholder involvement, performance measurement and customer satisfaction.

2.3.2 Stakeholder involvement

A building project involves several actors such as the client, designers, contractors, project managers and users and each of them have their own role, requirement and objective (Wang & Huang 2006). All of the stakeholders set demands on organization, coordination and communication. If the mentioned stakeholders do not function well, there are often problems like higher costs, delays, low quality and poor function of the final product. The main actors, which carry out a construction project, are engineers, architects and contractors. The process becomes complicated when investors, subcontractors, suppliers of equipment and materials, potential users of facilities, and Government agencies that regulate nearly every step of the process are involved (Moavenzadeh 1987).

Key stakeholders are usually considered responsible for many of the current quality problems or defects that occur in construction building projects. Jha & Lyer (2006) identify that one of the most important factors, which has an indisputable effect on project quality is efficient communication between parties involved in construction projects. Arditi & Gunaydin (1998) also affirm that high quality projects mainly depend on the relationship among the parties involved. Thus, Heravitorbati et al (2011) concluded that stakeholder incorporation within quality management planning and proceeding would facilitate greatly in solving large numbers of quality problems in building projects.

Therefore, effective relationship among stakeholders and involving stakeholders in planning and practice has immense help in solving quality failure issues (Wang & Huang 2006 and Heravitorbati

et al. 2011). Bubshait (1994) provides a clear interaction between project quality and stakeholder involvement as shown in Figure 4 below.

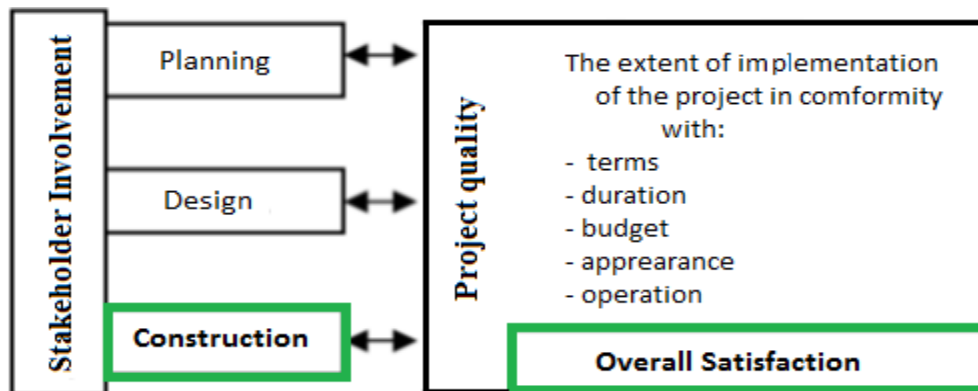


Figure 4: Relationship between stakeholder involvement and project quality

(Source: Heravitorbati et al. 2011)

2.3.3 Measure Project Performance

It is important to measure project performance in the agreed areas, at the agreed intervals, and to give feedback to the project team (CIB 1997). Performance should be measured on a regular basis throughout the project, which helps the team to review progress and identify opportunities for further improvement (Thomas & Thomas 2005). Benchmarking allows a project team to learn from best practice by comparing its own performance with others (Kelly et al. 2002). Without clear measurement of performance against benchmarks, it is difficult for any teams to determine how well they have done and what improvement they need to make (Cain 2004).

Measuring quality enable managers to know how close they are to their target and how to make the right decisions for improving work process (Oztas et al. 2005). Continual measuring of project performance for further improvement also helps in meeting customer expectation on the project outcome. Deming (1986) also affirms that the customer's perspective of quality levels is critically important. Hence it is important for the project team to understand what customer satisfaction means.

2.3.4 Customer Satisfaction

Successful companies need to meet their customer expectations through superior implementation of their quality policies; however, currently many customers are still not satisfied with the quality of constructed projects (Seaver 2001). Customer satisfaction model (Cook et al 2000) consists of five satisfaction quality dimensions: safety, project management (ability to plan schedules, manage and execute), contractor/customer relationship, cost, and prepared/skilled workforce. Clients have a substantial role to play in setting demanding and insisting upon improvements. Ultimately, they have the most to gain from ensuring the implementation of the best practice, (Latham 1994).

2.4 Defects in building construction

Defects in newly completed buildings are becoming a serious phenomenon as lower cost and medium cost house are being built (Alsadey, Omran & Pakir 2010). Construction defect according to Alsadey, Omran & Pakir (2010) is lacking and not meeting the required standard that may reveal as a building is constructed or after an element of work is completed. Construction defects usually include any deficiency in the performing of the design, planning, supervision, inspection,

construction or observation of construction to any new home or building. The defects usually start to appear after 2 years of occupancy (Chong & Low 2006).

Construction defect affects society or end-users due to possible danger posed and direct and indirect cost of repairs imposed. Some of the most common construction defects involve leaking roofs and windows, cracked and heaving concrete, cracks in walls and joints, defective plumbing and improperly installed electrical equipment. Construction defects typically involve some or all of the following conditions (Chew, Wong & Kang 1998; Alsadey, Omran & Pakir 2010) as shown in Table 1 and table 2.

Table 1: Common defects in building facade

Common Defects in building	Building facade									
	Wall	Floor	Tile	Metal sheet	Glass	Roof	Window		Door	
							Glass	Handle	Glass	Handle
Cracking										
Loose plastering of ceilings										
Delamination										
Surface appearance -Surface abrasion -Surface etching										
Corrosion										
Physical appearance Dentage -Deflection -Warping and buckling										
Water penetration										
Sealant defects										
Staining										

(Source: adapted from Chew, Wong & Kang 1998; Alsadey, Omran & Pakir 2010 and Chong & Low 2006)

Table 2: Causes and symptoms of common defects in building services

Service building installation	Symptom and possible causes
Water supply	<ul style="list-style-type: none"> - Insufficient water pressure or flows due to blockage or leakage of the components of the supply system such as pipes or valves - Stoppage of supply due to pump failure, breakage of supply pipe - Water seepage due to defective pipes (pipe joints) or valves - Sudden rise in consumption due to leakage in the system after water meters - Noisy water pumps, noisy water inlets due to defective water pumps, undue water pressure
Electric supply	<ul style="list-style-type: none"> - Stoppage of supply / system breakdown due to failure of fuse or circuit breaker - Sudden or frequent fuse or circuit breaker cut off leading to stoppage due to earth leakage - Heating of switches and wires due to overloading - Sudden or frequent stoppage and larger power consumption due to uneven distribution of phases - Electric sparks or shocks, electrocution due to inadequate earth bonding

(Source: adapted from Chew, Wong & Kang 1998; Alsadey, Omran & Pakir 2010 and Chong & Low 2006)

2.5 Conceptual framework

A number of authors have provided different categorizations of quality problems. However, few comprehensive approaches are made to identify the major source and factors that affect quality (Heravitorbati et al. 2011). Based on extensive review Heravitorbati et al. (2011) identified four main sources of quality defects namely, stakeholders managerial, technical, environmental, material and equipment culture and politics. These main sources of quality defects as identified by Heravitorbati and al. (2011) can be used as a framework to identify causes of quality problems in construction projects. In addition, this extensive review encompasses all the identified causes of defects identified and discussed in previous sections of this literature review. The figure below summarizes the concept proposed by Heravitorbati et al. (2011).

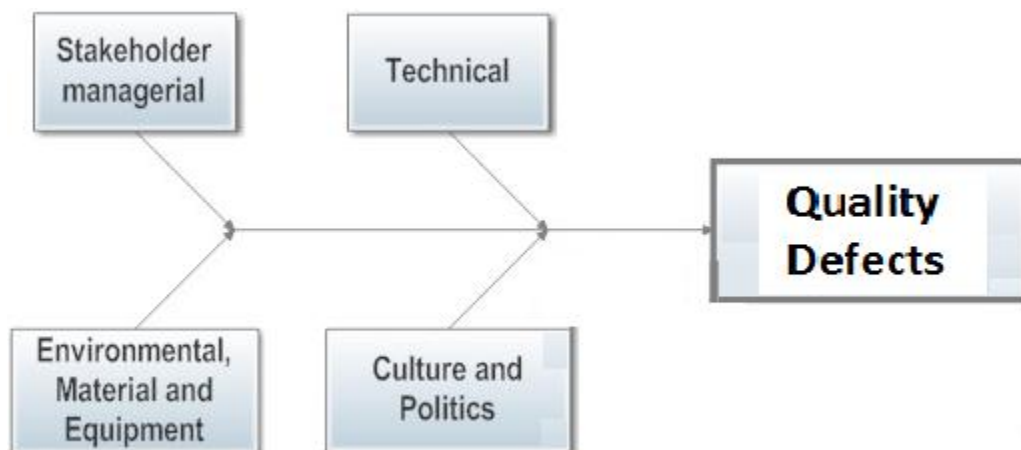


Figure 5: Framework for Quality Defects

(Source: adapted from Heravitorbati and al. 2011)

Due to its unique characteristics of involving so many actors in construction projects, stakeholder management appears to be one of the most fundamental and important factors of a project (Heravitorbati and al. 2011). On the other hand, culture and politics have the lowest impact on project quality. Common factors that attribute to the major sources of construction defects stipulated in the table-3 below.

Table 3: Sources of quality defects in construction Projects

(source: Heravitorbati et al 2011, Latham 1994 & Moavenzadeh 1987)

<p style="text-align: center;">Stakeholders managerial</p> <ul style="list-style-type: none"> - Lack of contractor supervision - Poor relationship and collaborating - Poor communication - Reduced subcontractor responsibility - Inappropriate method of contractor selecting - Poor quality procedure and department - Poor training system - Lack of process improvement - Lack of management talent and commitment - Lack of quality policy - Low effective project management system - Bureaucracy Supplier impact 	<p style="text-align: center;">Technical</p> <ul style="list-style-type: none"> - Low quality drawing and specification - Design complexity - Difficult data collection system - Poor performance of quality tools - Lack quality management - Difficult application of quality system - Lack of technical talent - Poor Workmanship - Human Error
<p style="text-align: center;">Environmental, Material and Equipment</p> <ul style="list-style-type: none"> - Nature uniqueness - Project size and complexity - Material/Equipment specification - Project Environment - Poor quality and unavailability of resource - Equipment idleness and inefficiency 	<p style="text-align: center;">Culture and politics</p> <ul style="list-style-type: none"> - Lack of motivation - Incompatible tendering procedures - Lack of collaborative working atmosphere (mutual objectives, gain and pain sharing, trust, no blame culture) - Corruption - Lack of being customer oriented and focused - Emphasis on production and project duration

Chapter 3: Research methodology

3.1 Introduction

This chapter discusses the research design and methodology used in acquiring the necessary information to answer the research questions. It specifically presents the research questions, describes research approach and techniques, operationalize variables and indicators, presents sampling techniques in terms of sample size and selection, validity and reliability of the research, data collection methods and data analysis methods.

3.2 Research strategy and type

This is an evaluation research with the aim of evaluating the AAIHDP in the context of quality of constructing houses. It is emphasizing on examining factors contributed to poor performance of small-scale contractors and MSEs on one hand and identifying the quality defects of the houses on the other hand.

3.3 Research Questions

1. Does the mechanism introduced to enhance capacity of small-scale contractors and MSEs have an impact on their responsiveness in carrying out their duty?
2. What main problems observed in terms of quality of construction of the condominium houses?
3. What are the constraints/ main challenges small-scale contractors and MSEs face during the construction process?

3.4 Research Approach and techniques

The research uses both qualitative and quantitative data with the aim to find factors that lead to poor performance of small-scale contractors and MSEs during the construction process and examine the AAIHDP support and its effect on their performance. On the other hand, by using the same technique this research identified the quality defects related to poor performance during construction.

3.5 Data Collection Method

The research uses both primary and secondary data collection methods as a tool to gather the necessary information. The primary data was collected using three methods and mainly through a survey by administering questionnaires (four) to selected respondents. In depth interview of some of the respondents; and on-site observation of the on-going and a finished construction site and the handed over buildings are other sources of primary data.

Translation of survey questionnaires to local language (Amharic) was mandatory especially for occupants and MSEs. This is because the English language is not widely used by the majority of the people in Ethiopia. Moreover, the entire interview was conducted in local languages for ease of communications. This implies the need of translating the questionnaire and interview guides to local language prior to starting data collection.

Secondary data was obtained from contract agreement, site reports, policy document, and organizational records of the project.

3.6 Operationalization: variables and indicators

The table below presents variables and indicators that help to operationalize the main research questions. The selected variables and indicators are derived from a literature review.

Research questions	Variables	Indicators
What are the constraints/ main challenges small-scale contractors and MSEs face during the construction process?	Stakeholder Managerial	Poor relationship and collaborating
		Reduced subcontractor responsibility
		Poor quality procedure and department
		Lack of process improvement
		Lack of management commitment
		Lack of quality policy
		Low effective project management system
	Technical	Bureaucracy supplier impact
		Low quality drawing and specification
		Design complexity
		Difficult data collection system
		Poor performance of quality tools
	Culture and politics	Lack quality management
		Lack of technical talent
Difficult application of quality system		
Lack of motivation		
Incompatible tendering procedures		
Lack of collaborative working atmosphere		
Not being customer oriented and focused		
Emphasis on production and project duration		
Environment material and equipment	Corruption	
	Nature uniqueness	
	Project size and complexity	
	Poor quality and unavailability of resource	
	Project environment	
	Equipment idleness and unavailability	
Does the mechanism introduced to enhance capacity of small-scale contractors and MSEs have an impact on their responsiveness in carrying out their duty?	Mechanism	Material/Equipment specification
		Capacity building programs
	Capacity	Contractor selection mechanisms
		Training system
	Quality expectations	Skill (technical and managerial)
		Financial
What main problems observed in terms of quality of construction of the condominium houses?	Defects of construction	Customer satisfaction
		Meet stakeholder requirement
		Wall cracks
		Mal-functioning of sanitary installation
		Mal-functioning of electricity fixtures
		Maintenance requirement

Table 4: Research questions, variables and indicators

3.7 The study population and sample

Following the purposive sampling technique, a project for the study was selected. Project selection was based on the following criteria: a finished project handed over to the occupants and the other an on-going project. This helped to take the research samples from one project. Accordingly occupants who lives in the finished condominium houses and contractors and MSEs who participated in the finished project and now working on the on-going projects were selected as primary respondents. All HDPO officials and one of the consultants who are currently working on the project and selected as another set of respondents were also part of the previous project.

The population then comprised small-scale contractors and MSEs who engage in construction work, the consultants who are responsible for supervision of the whole of the work, HDPO officials who are responsible for training and capacity building and at last the occupants who are living in the constructed houses.

Drawing a sample from the occupants was not an easy task because of its big size of population. Yet, a large size sampling approximately 205 respondents are selected to ensure representativeness of the sample. To execute the data collection employing of research assistance was necessary. Accordingly, two-research assistances were engaged in this data collection.

Purposive sampling was employed to select respondent from the whole population for in-depth interviews and questionnaire. Table-5 below shows the framework for the sampling and data collection techniques.

Table 5: Framework for sampling and data collection

Item No.	Type of repondents	Sample size	Sampling technique	Data type	Data collection method	Research instrument
1	Small-scale contractors	20	Purposive-Random	Primary	Survey	Questionnaire
		1	Purposive-Random	Primary	In-depth interview	Interview guide
2	MSEs	21	Purposive-Random	Primary	Survey	Questionnaire
		2	Purposive-Random	Primary	In-depth interview	Interview guide
3	Consultant	2	Purposive	Primary	Survey	Questionnaire
		1	Purposive	Primary	In-depth interview	Interview guide
4	HDPO	3	Purposive	Primary	In-depth interview	Questionnaire
			Purposive	Secondary	Documentary analysis	Document review checklist
5	Occupants	205	Purposive-Random	Primary	Survey	Questionnaire
		2	Purposive	Primary	In-depth interview	Interview guide
		20	Purposive-Random	Primary	Observation	Checklists

Source: Author 2012

3.8 Research design

The main activities of the research design are summarized in the figure below.

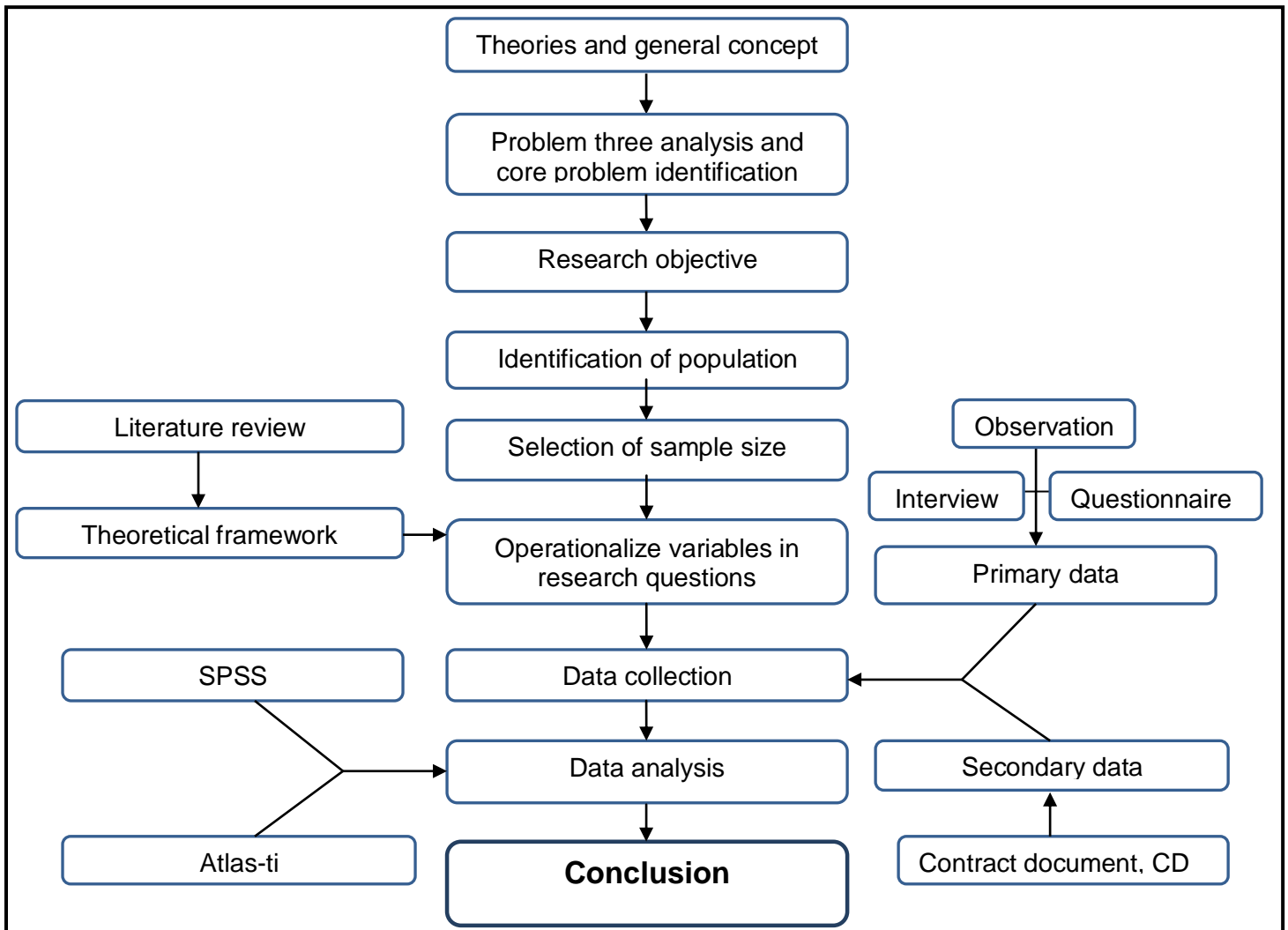


Figure 6: Steps of research design

3.9 Validity and Reliability

To ensure validity and reliability of the research, variables are comprehensively defined. This also helps to reduce misunderstandings thus increase the reliability of the measuring instruments. Moreover, triangulation of results employed to ensure reliability of the data collected. Thus, all the data acquired from different sources compared and cross checked.

Besides, to ensure reliability of the data, the questionnaires were tested prior to distribute to the intended respondents. The questions then amended based on the comment collected from those who participated in the test. The validity of the data was also acquired through careful selection and use of appropriate size of the sample.

To avoid misunderstandings, the questionnaires were translated into the language (Amharic) understandable for the respondents.

3.10 Data Analysis Method

The collected data analysed using SPSS and Atlas-ti computer program for qualitative and quantitative data respectively. This computer program helped me to reduce the occurrence of error during data analysis. Besides, it was fast and more accurate.

Chapter 4: Research results and analysis

4.1 Introduction

This chapter comprises of research findings and analysis. The findings here are an analysis of collective fieldwork data presented based on the research objectives and research questions. A short description of the study followed by introduction of general characteristics of research respondents is presented at the beginning for clear understanding of these findings and analysis. Then the next section provides a presentation and analysis of the data regarding the research questions.

The analysis has three main parts categorized based on the research questions. The first part comprises developmental activities or supports the program provides to MSEs and small-scale contractors. It evaluates the support programs in depth to identify the extent in which the support program improves the performance of small-scale contractors and MSEs. The second part then analyse the responsiveness of the small-scale contractors and MSEs after receiving the supports discussed in the first part. Their responsiveness is mostly reflected on the quality of the construction. Quality defects, which are observed in the completed buildings, are thoroughly addressed in this analysis part. The possible causes for the defects are analysed and presented in the last part of this chapter. Accordingly, the last part comprises the project limitations mainly the constraints of MSEs and small-scale contractor.

4.2 The Project description

4.2.1. The project

After AAIHDP inauguration, a total of 72,782 houses had been built. Up to date 61,964 houses had been completed and transferred to occupants, 1900 houses are in the process of transferring and 8918 are under construction. The construction sites are distributed in all sub-cities of the Addis Ababa as shown in the map (figure7) below. The AAHDPO has branch project offices in each sub-city. These offices are responsible to provide land for construction, recruit and provide small-scale contractors and MSEs and provide supporting scheme for MSEs. The head office on the other hand is responsible for regulating and administering all projects.

The selected project site for this research is Akaki-Gelan site in Akaki Kality sub-city located 19 kilometres to south from the city centre. The project started in 2007 and has three construction phases “Akaki-Gelan I”, “Akaki-Gelan II” and “Akaki-Gelan III” (see the picture below). In the project a total of 256 small-scale contractors, 280 MSE, 142 hauling and handing enterprises, two consulting firms and Housing Development Project Office (HDPO) has been involved.



Figure 7: Gelan I and II project

HDPO is responsible for both supervision and administration of the project. As any other construction projects in Ethiopia, HDPO also planned to engage consultant in the project. This believed to facilitate the work progress and ease the load for the client (HDPO 2012)². In addition, the consultant can assist the project through offering expertise and best practice to ensure efficiency and on time completion of the project. Thus in 2008, HDPO appointed one consulting firm “GATMES consulting firm” as a trial for supervision of “Akaki-Gelan I and II” projects. According to HDPO, the result turned out positive and engaging consultants for proper managing and supervision of the work was found to be necessary. As a result, consulting firms start to be part of the project and two consulting firms “GATMES consulting firm” and “Gejaw consulting firm” were employed in the third project “Akaki-Gelan III”.

² Interview with HDPO construction officer, July 2012

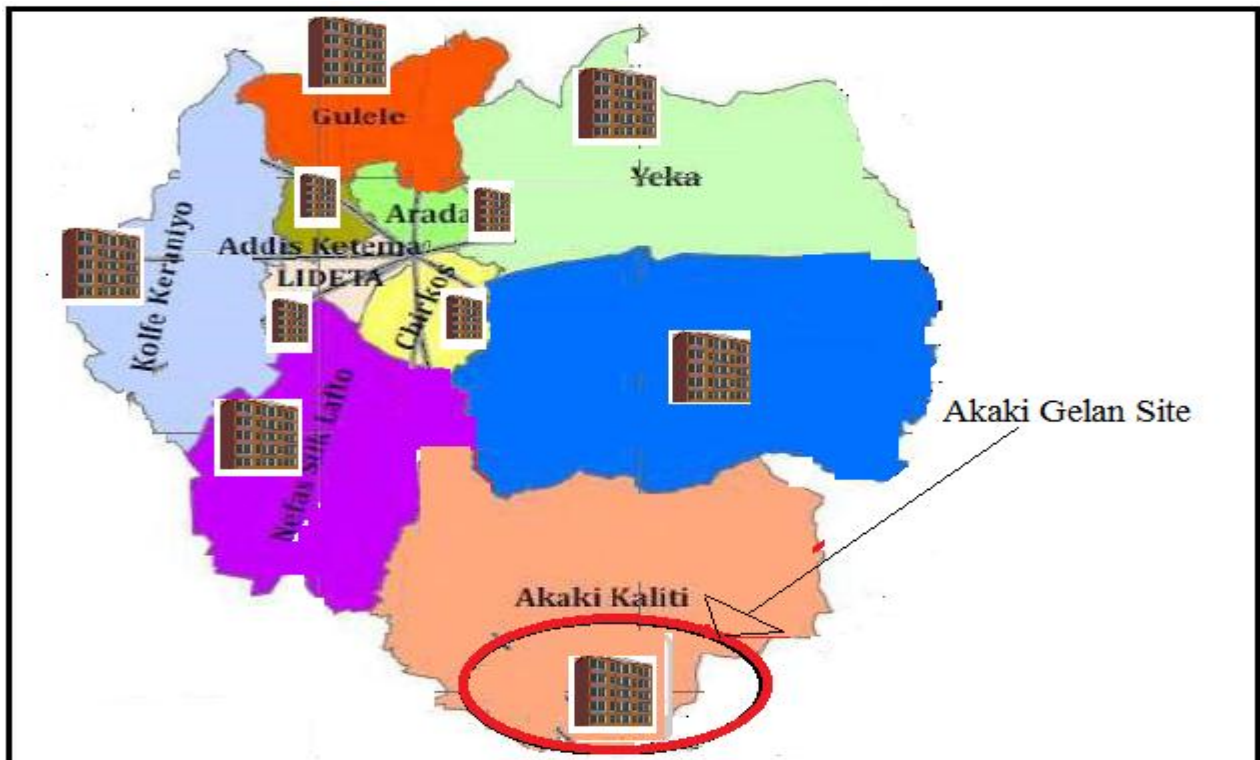


Figure 8: Condominium project site locations

“Akaki-Gelan I and II” was completed in 2010 and the majority of the houses have been transferred to the occupants. In these two phases, 160 blocks that consist of about 3,787 housing units are constructed. The third project “Akaki-Gelan III” commenced in 2011 and still under construction. This project intends to build 5000 housing units in 213 blocks.

4.2.2. Project participants

A total of 488 enterprises are participating in Akaki-Gelan III project where temporary and permanent jobs for 7773 people have been created. A summary of stakeholders involved in the project together with the type of work they are engaged in and the number of job opportunities created are presented in table 6 below.

The respondents in this research are drawn from the population listed in table-6. Sample respondents are taken from every enterprise. To make the selected sample more representative of the population, the number of the respondents taken is a minimum of 10% of the population. Accordingly, 20 small-scale contractors randomly selected as primary respondent. On the other hand, 21 MSE respondents purposely selected from 139 MSEs participating in production, installation and finishing works. It is purposive sampling because careful consideration was needed to include different types of MSEs from different areas of expertise.

Four HDPO officials who have different responsibilities in the project were selected to give insights about the project. The respondent helped to get overall information on how contractors and MSEs are engaged in the project and what supporting schemes are provided for them. In addition to this, other respondents from consultants were added to supplement the primary respondents.

Table 6: “Akaki Gelan III” housing project stakeholder involvement and job creation

(Source: MSEs work progress follow up report 2012)

No	Type of Work	Type of Enterprise	Number of enterprises	Job creation		
				Permanent	Temporary	Total
Construction works						
1	Sanitary installation	MSEs- 1	19	102	54	156
2	Electrical installation		38	196	28	224
3	Agrostone (partition) wall manufacturing and installation		3	28		28
Total			60	326	82	408
Construction material production						
4	Pre-cast beam	MSEs-2	27	318	76	394
5	Hollow block		62	812	131	943
6	Steel Works		50	50	200	250
Total			139	1180	407	1587
7	Constructing	Small scale contractors	184	1348	1256	2604
8	Consulting	Consultant	2	67		67
9	Client	Housing development Project Branch Office	1	83		83
10	Hauling, Handling and transporting of construction material	MSEs and Transporters	102	442	2582	3024
Total			488	3446	4327	7773

Another set of respondents was taken from occupants who own condominium houses or who are currently living in the condominium houses in the selected site. These respondents were helpful in identifying defects observed before and after occupancy.

4.2.1.1 Description of project participants

Small scale

The personal profile of the contractors shows all contractors are well educated and have an average work experience of more than four years. The majority of respondents, which account for 70%, have university degrees and the rest have MSc degree or college diploma.

Look at their company profile the majority of the contractors (85%) fall under the category of GC/BC³ grade 5-6 and only a few falls under category GC/BC grade 3-4. The majority of the contractors or 90% of the respondents have less than ten key employees. The analysis shows there is a close relation between years of firm's establishment and years of participation in condominium projects. This shows 65% of the contractors establish their company initially to participate in condominium projects. In addition, currently all contractors are participating in other construction projects besides condominium projects.

³ GC/BC – General Contractors or Building Contractors

MSEs

The majority of the respondents of MSEs are managers and accountant in their respective enterprises, which accounts for 70% and 20% of the total respectively. Their educational background varies from high school level (52%) to university degree (5%) and the rest 43% of the respondent has a diploma or vocational college certificate. According to the analysis different age group participate in this project but 52% of the respondents is an age group from 24-29. As in any other construction projects in Ethiopia, the number of female respondents are few.

Like contractors, year of enterprise's establishment is highly related to years of participation in condominium projects. Besides, the majority of MSEs does not have work other than condominium projects. More than 50% of the enterprises have ten members working together. The remaining enterprises have members varying from one to twenty. The respondents were selected from each area of expertise except 'manufacturing and installation of Agro stone partition walls. It is because this area of expertise is new since using Agro stone as partition wall started in Gelan-III projects and MSEs who are part of manufacturing and installing of this wall are new, and they had not started operating fully at the time of data collection.

Consultant

There are two consulting firms in this project: GATMES is responsible for supervision of 100 buildings and Gejaw is responsible for supervision of 113 buildings at the project site. They are responsible for construction management issues; works inspection and approval, material approval, payment approval and manage contractual issues. The project coordinators of the two firms are the main respondents of this research. They acquired a high level of education and have work experience of more than five years in construction projects of similar nature. One of the coordinators has been working since the commencement of the project. He also participated in the previous projects Gelan-II and I thus, besides the questionnaire in-depth interview with him has taken place.

AAHDPO

AAHDPO is the responsible body for the administering and regulating the whole of the work. The project office on site is responsible for the follow up and administration of the specific site under the supervision of head office. The respondents are one engineer from construction follow up office and head of MSEs' work progress from head office. Moreover, there are two respondents from the project site: the construction officer and MSEs follow up and work progress coordinator.

4.2.3. Organizational structure, Work relationships and Role of Stakeholders

According to the organizational structure, "Akaki-Kality" Sub-City Housing Development Project office leads the project at the site level. The office has two main sections one is a construction section that is responsible for construction works and the other is procurement and finance office that is responsible for material delivery (raw materials and prefabricated materials). The consultant and contractors are under the management of the construction section. The other important office is MSEs work progress follow up office, it manages and assist all MSEs in the project. MSE-1 is MSEs who act as subcontractors responsible for installation works in the project and they are under supervision of the main contractors. The others are MSE-2 who is responsible for production works are under the management of procurement and finance section. The project organizational chart illustrates the organizational structure of enterprises in the project (figure 8).

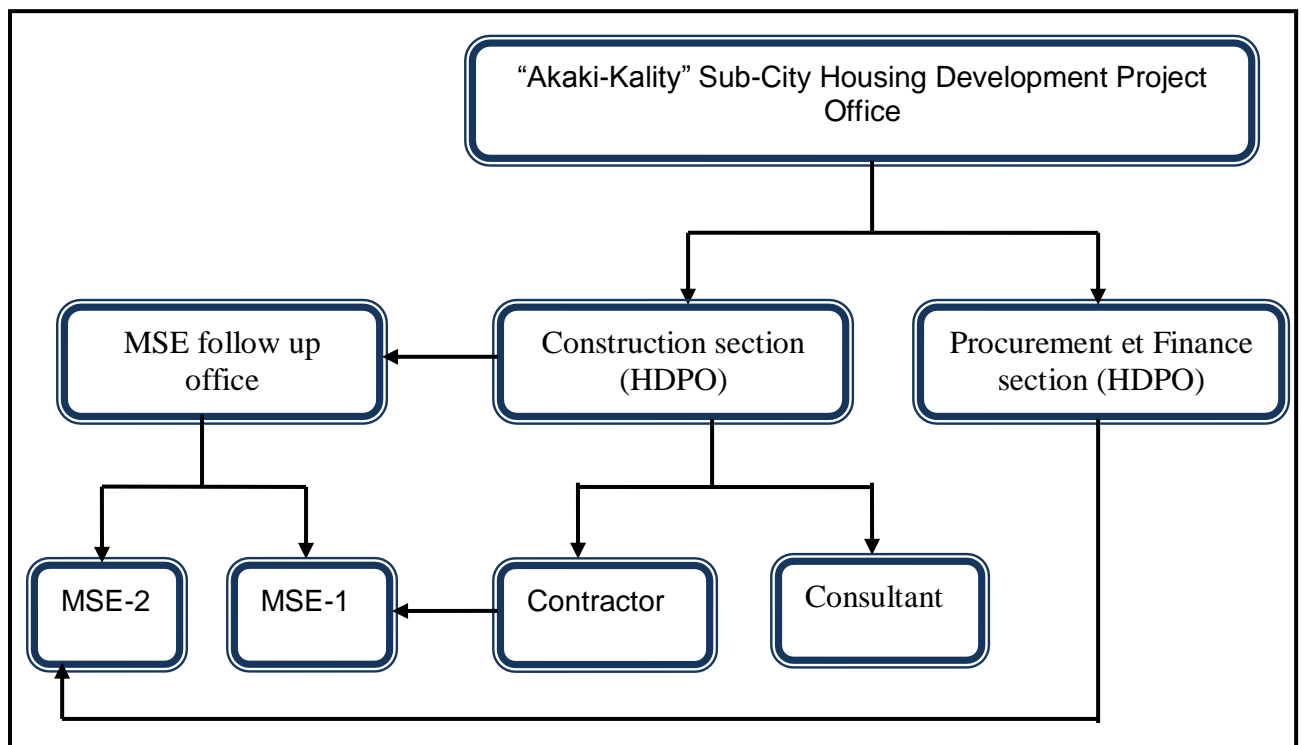


Figure 9: Organizational structure of the project

Each stakeholder has a contractual relationship with the client (Addis Ababa ‘Kality’ Sub-City Housing Development Office). For the supervision of the work, it is a simple service contract between the client and the consultant. However, for works contract it is somehow different from the practical works contract widely used in the construction industry in Ethiopia. There are three types of subcontracting: domestic subcontract, nominated subcontract and selected subcontract. It is customary that a contract is awarded to a giant contractor and the contractor execute the main work by himself in doing so he might give some parts of the works to any entities or a group of individuals which is called subcontractors

- Domestic subcontractor is a subcontractor appointed by the main contractor at his discretion.
- Nominated subcontractor is a subcontractor nominated by the employer, which the contractor is obliged to appoint as a subcontractor.
- Selected subcontractor is the subcontractor selected by the main contractor in consultation with the employer as regards to the requirements of the contract.

Among the above stated subcontracting options usually whether it is a public or private building construction contract, domestic subcontracting is common in Ethiopia. As stated in Sub-clause 4.3 of the FIDIC Conditions of Subcontract, the main contractor is the sole responsible entity for the subcontractor he has hired, the contractor himself will make sure the works executed by the subcontractor is in accordance with the contract requirement and the best engineering practice. However, in case of condominium housing projects the employer breaks down the work and gives it to different subcontractors ((MSE-1)), with the capacity of the housing development agency to supervise the works. The number of MSEs and their capacity make supervision difficult and produce less quality work. It should not be forgotten that the housing project itself has a huge number of main contractors.

To name some of the unique characteristics of this contract; the subcontractors in this case MSE-1 are assigned by the client, the main works contract is signed by three parties, the contract is a labour contract because the material is supplied by the client, and the contractual agreement is based on a fixed unit price.

Thus, the works contract is cooperated contracts signed between the client, the contractor and MSEs-1. The contractor's main responsibility is to construct structures that are listed under table-7. The main duties of MSE-1 are installation of building fixtures and utilities and painting works. The three parties (HDPO, Contractors and MSEs) sign an agreement on the same contract. The contractor is entitled to 5% of management fee for managing the subcontractor (MSE-1) under his supervision. The other set of contract is a production agreement between Addis Ababa 'Kality' sub-city Housing Development Project Office- procurement section and MSEs production workers (MSE-2). This contractual agreement is signed for MSEs to manufacture and supply building components for the project. The different set of contractual agreement between HDPO and each stakeholders is illustrated in the diagram in below.

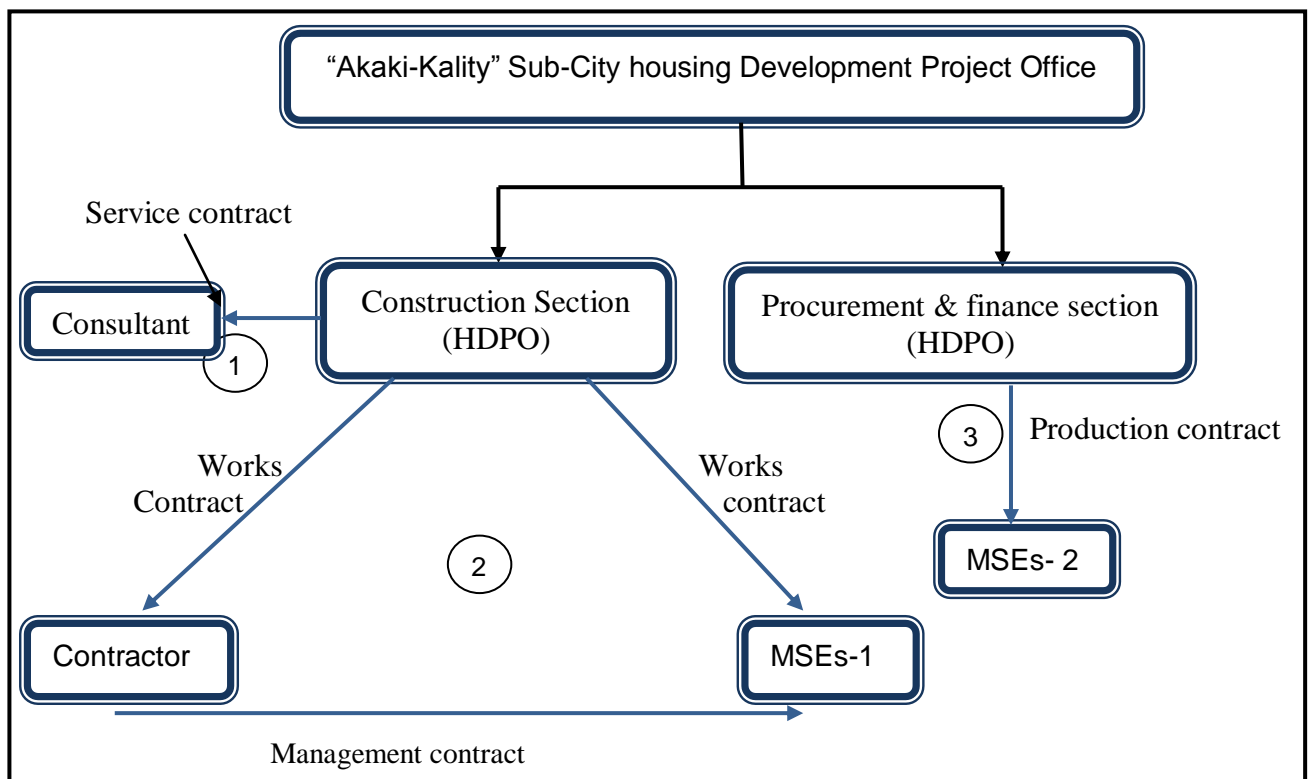


Figure 10: contractual relationship between each stakeholder

According to their contractual obligation, each stakeholder has specific roles in the project. All stakeholders are aware of their responsibility starting from the commencement of the project. Any stakeholder who does not comply with performing his responsibility considered as a defaulter. Table-7 in the next page summarizes duties and responsibility of each stakeholder.

Table 7: Main duties and responsibilities of each stakeholder

Stakeholders	Duties and responsibility
AAHDPO (Head Office)	Select and send lists of contractors Prepare the contract document Prepare specification Fix unit rate
AAHDPO (MSE Development Office , 'Akaki-Kality' sub-city)	Recruit MSEs Provide support to MSEs (loan, equipment, working place, training)
Addis Ababa 'Akaki-Kality' sub-city Housing Development Project Office - Construction follow up office	Perform contractual agreement and contract administration Assigning of contractors Supervision of works (responsibility for quality of work) Check and approve payments (contractors, consultant and MSEs-1) submitted by consultant Request demand for MSEs (type and quantity) Control and manage distribution of productions (construction material)
- MSEs follow up office	Facilitate working atmosphere for MSEs Give information and advisory service Sometimes gives MSEs on-site training or guidance
- Construction material procurement and finance office	Responsible for procurement of the prefabricated material from MSEs
Consultant	Work inspection Payment (contractors and MSEs-1) approval Construction material approval Responsible for quality of work
Small Scale Contractors	Substructure construction- site preparation and foundation Super structure construction- columns, beams, slabs, HCB walls Finishing works (plastering, cement screed and terrazzo)
MSEs-1 (labour)	Electrical installation Sanitary installation Roof fixing Metal door and window production Handrails for stairs Painting
MSEs-2 (production)	HCB production Pre-cast concrete Concrete walls Partition wall (agro-stone)

4.2.4. Employing project participants

Most widely used procurement method in the construction sector of Ethiopia is tendering. Sometimes the direct award is used for special type of projects. For instance, if the project is urgent and to avoid time spent in a tendering procedure, if the project is too small, if eligible participants are few, or if the project is unique in its character direct award is used. The tendering procedure follows the Ethiopian construction laws for procurement of services or procurement of works and the selection is normally based on technical or financial capability of the participant or both.

The Addis Ababa Housing Development Projects considered as a special type of project because it was formulated through a policy. The policy has two intentions, one is obviously to construct houses with low cost and the other is to create employment. No tendering procedure was necessary because the price is already set by the office and the intended participants are already available. The eligibility criterion for participation of small-scale contractors and MSEs is discussed in the subsection below.

Small-scale contractors

Any contractor who has a construction license of less than grade-6 can register to participate in the construction of condominium houses in Addis Ababa. Civil engineers who have the educational background related to construction and the necessary work experience have the right to get a construction license from their respective Sub-Cities. However, the type of the license vary from Building Contractor/General Contractor of grade 9 to grade 1 (BC/GC 9- 1) based on the educational level of the manager, educational level and number of key employees, and own capital of the company.

Up on registration, interested contractors are only expected to present their company profile, VAT registration and renewal certificate together with their license. After registration, the housing Development Office prepares training program for 3-5 days. The training is prepared to give insight and knowledge about the project. Following the training, the contractors are assigned to different project sites through the lottery drawn at the HDPO main office. Contractual agreement for works contract are then signed between HDPO project office and the contractors.

A total of 213 contractors were assigned to Akaki Gelan III project and only 184 are proceeding to work and the rest 29 contractors got terminated. Both HDPO's construction officer and the consultant indicate the contractors as a defaulter for the termination. From their explanation, many contractors ceased the work because of their incapability (financial constraints or lack of management) to cope with the project.

MSEs

In Ethiopia, there are no specific criteria to establish Micro and Small Scale Enterprise (MSE) and it is done voluntarily. Any interested citizens who wish to participate in the project can register individually in their respective sub-cities based on their area of interest. No educational background is required to select an area of specialization except for electrical works, which sometimes require some experience or vocational school certificate. After registration, the MSEs development office prepares training program with the intention to build technical and management capability of MSEs. The training is given for only 3-7 days based on their selection of specialization, this is discussed in detail under the next section. Upon completion of the training, the sub-cities give certificate for the participants. The trainees then form an association, which consists of two to

twenty members or can start working individually. The sub-city's MSEs development office then certifies and gives recognition to the association formed.

The MSEs development office then forwards the lists of the certified MSEs to the project office upon request. Based on their area of specialization the MSEs are assigned to different blocks through the lottery drawn on the project site.

4.3 The project supports and its effect

This section deals with the capacity-building program to find an answer for the first research question:

“Does the mechanism introduced to enhance capacity of small-scale contractors and MSEs have an impact on their responsiveness in carrying out their duty?”

It is an assessment of the program in terms of its extent, effect and outcome done by the contractors and MSEs themselves. In addition, for the purpose of cross tabulation the opinion of HDPO officials and the consultants is added.

The evaluation was further done through assessment of the outcome of the project, in this case the constructed houses. The quality of the constructed houses, which is addressed in the subsequent section, helped the researcher to measure the performance of small-scale contractors and MSEs.

From the survey made to find out the effect of the support contractors and MSEs have been provided, about 50% of contractors and 25% of MSEs believe that it has a moderate effect on improving their performance. The **majority** of MSEs commented that the support actually has only a minor effect.

Support for the contractors

The contractors receive different types of support from HDPO. For instance prior to the beginning of the project, HDPO organized a 3-4 days training mainly concerned with improving management skill and introducing the program to contractors. In addition, there is financial support in the form of advance and construction material support. The contractors are supplied with almost all-major construction material (80-90%) except sand, wood and other miscellaneous material.

Even if 60% of the respondent are agreeing that the overall support program has improved their performance only 35% of the respondents are satisfied with the financial and material supports and few satisfied with the training provided to them (see chart-1 below). The contractors even argue that there has been no training instead it was just the orientation of the program thus; it does not have anything to do with capacity building. They added that the training organized is too short and not performance oriented. Most of them criticized the training that it is mainly focused on introducing to the program. HDPO also confirm that due to the limited budget and professionals, they are only able to prepare 3-4 days training. Thus, the duration is too short to equip the contractors with sufficient managerial and technical expertise. The majority of respondents (80%) is very dissatisfied with the equipment support. From the interview, it is found that the equipment support was adequately available at the beginning of the program when HDPO used to facilitate loan to contractors to buy major equipment necessary for their works.

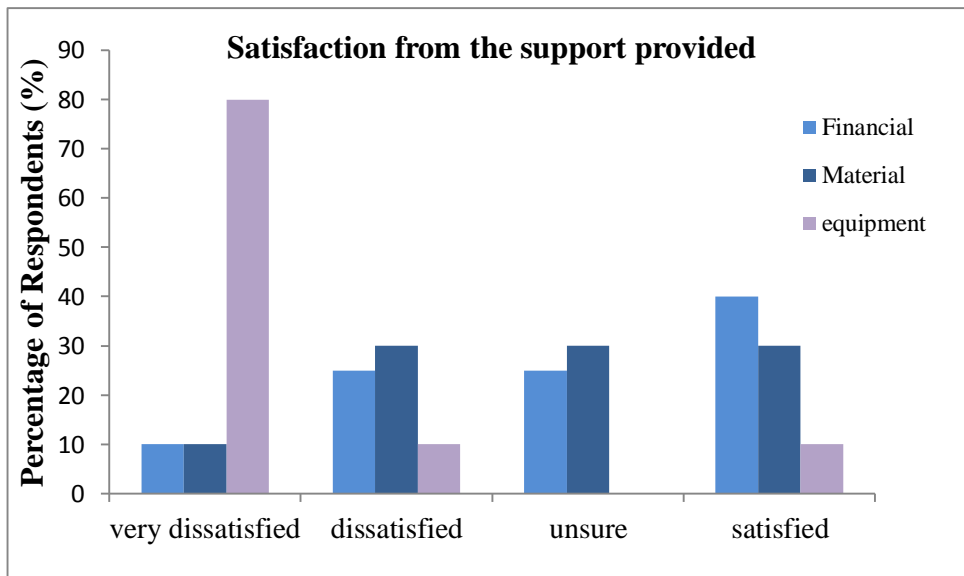


Chart 1: Contractors level of satisfaction with the support program

Support for MSEs

MSEs comprise the largest share of enterprises and employment in the non-agricultural sector in Ethiopia. Hence, MSEs have been a special focus of the government and its promotion and development was emphasized as one of the most effective means for achieving faster development and creating job opportunities (DWCP 2009). For instance in the construction sector alone 1,969 MSEs has been established and permanent and temporary work opportunities for 43,138 and 13,498 people has been created respectively.

The specific objective of the AAIHDP concerning MSEs is promotion of micro and small-scale enterprises, which can absorb more labour force and operate at a lower overhead cost as well as promotion of cost efficient housing construction technology (GTZ/ETH 2005). There is a steering committee established to promote and solve problems faced by MSEs. MSE development bureau, MFIs - Micro Finance Institutions and TVET-Technical Vocational Education Training are the major supporting organizations. Table 8 on the next page summarizes the responsibility of each stakeholder in the committee.

The MSE development program in Ethiopia is more focused on pro poor people: unemployed youth and women, TVET school graduates, school dropouts, existing MSEs as weavers, street vendors, traditional handicraft operators, and people who live on the street.

There are a MSE development office in every sub-city, which are responsible for recruiting and facilitating training services for newly recruited MSEs. The training organized in collaboration with HDPO and TVET. The training given is two types one is managerial and the other is technical. The theory part of the training delivered by sub-sites focus on management aspects that includes administration, accounting, profitability, and saving and it takes up only 4-5 days. The duration for technical part is different for different specialization. For instance pre-cast beam production takes 5-10 days and electrical and sanitary installation take about 10-30 days.

Table 8: Stakeholder responsibility

(Source- Addis Ababa city administration micro and small enterprises development bureau)

Organizations	Supports
MSE development bureau	Premises support, market linkage, counselling service, business plan development
MFIs	Loan provision, saving service, awareness creation on saving, consultation
TVET centre	Provision of technical and business management training, technology development
Communication bureau	Communicate the community on the development of MSEs, best practice expansion, promotion
Trade and industry bureau	Trade licensing, investment licensing, support transformed enterprises from MSEs to medium et large scale industry
Design and construction bureau	Designing et follow the construction of MSEs working sheds and buildings, market linkage to MSEs engaged in construction sectors
Housing Project Office	Market linkage to MSEs engaged in construction sectors.
Women and youth affair bureau	Attitude change working habit, awareness creation on MSEs benefit et role, finance support to women

Besides the training supplied by sub-cities, the MSEs follow up office sometimes prepares practical training. For instance in this project, the office organized on site practical training for four days. The former MSEs who were already participating in the previous projects of “Akaki Gelan-II and I” gave the training. It is because MSEs’ follow up office believes that the former MSEs have sufficient experience and technical expertise on their specific specialization.

The MSEs coordinator added that MSEs obtain other capacity building supports. For instance, “Addis loan and saving enterprise” under the guarantee of HDPO provide them loans to purchase machineries and tools. Construction material supply, place of work and provide utility lines (water and electricity) are other supporting schemes. Besides, during execution of work if they face equipment failure TVET will assist them in maintaining it.

To learn whether the above stated supports have an impact on the performance of MSEs a survey was conducted and only 10% of the respondents agree on the training effectiveness to improve their technical knowhow. However, around 50% of the respondents found the training easy, understandable, and it helps them to improve their managerial know how. Besides, they believe that the knowledge acquired is practical to use in this project as well as for other similar construction projects. As commented by MSEs and confirmed by HDPO officials the training is mainly focused on program’s orientation, thus it indeed creates awareness to the majority of the respondents.

The findings reveal that they are quite a large number of MSEs who found the training not easy and difficult to understand (74%). In addition, many MSEs found the training not adequate for knowledge transfer thus; it could not be applicable to this project also to other projects. The

relationship analysis shows that the majority of the respondent, whose highest level of education is high school, found the training difficult to understand. They further argue that the training is not enough to acquire sufficient knowledge. On the other hand, the type of training and duration is different for different specializations; accordingly, MSEs who participate in the installation works found the training more difficult to understand than the MSEs who participate in production works.

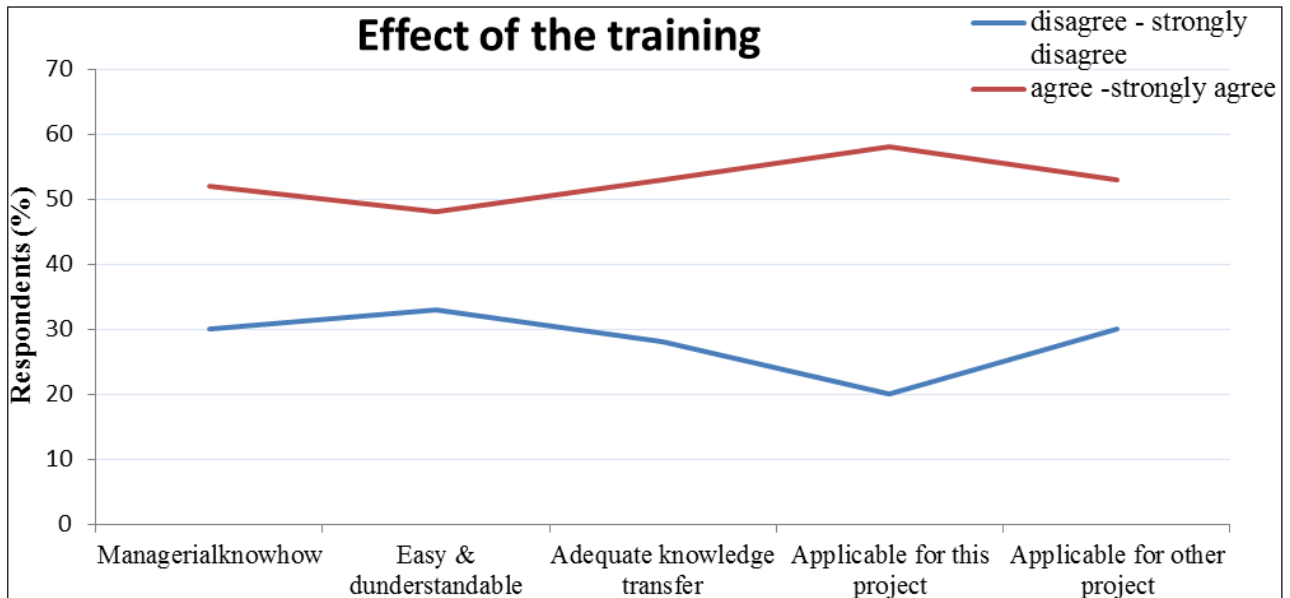


Chart 1: MSEs responses on the effectiveness of the training

From the interview made with the head of MSEs’ work progress office, the HDPO is also aware of the training’s inadequacy to equip MSEs with the necessary knowledge and to enable them to stand by their own. HDPO identified the constraints of MSEs development program not to provide satisfactory training. Some of these constraints are the short training period, unavailability of professional, and shortage of material to give practical training. On the other hand, MSEs follow up and work progress project office coordinator said that the training they have been given at the sub-city level is adequate. He also argues that even if we want to provide training before commencement of the project, MSEs would not be interested and motivated. This is because, since most MSEs came from poor economic backgrounds what they want is to start work and get paid immediately. Besides, it is difficult for HDPO to cover their cost for the time they spend in the training, as they need daily allowance for miscellaneous expenses like transportation and food.

Thus at least to narrow the gap created from the inadequacy of the training and as part of its responsibility, MSEs follow up and work progress project office distinguish the technical gaps and give the feedback to Sub-City’s MSEs development office. However, there is no communication channel available for MSEs to evaluate the program and give their feedback to HDPO. This, in the coordinator’s opinion, is because MSEs are more interested in getting money than acquiring knowledge.

The consultants also confirm that the training given is not adequate to create skilled workers. The technical know how they are acquiring in the training would not enable them to work on a single building let alone on huge projects like this. One of the project coordinators also underlined that with one week training it is difficult for MSEs to learn how to read plans (drawings) and installation techniques. He also added that if we look at the normal curriculum, technicians especially sanitary and electrical need two to three years intensive theoretical and practical lessons.

Giving strength to his words, the consultant said that sanitary and electricity are the important components of the building which can affect its lifespan. For instance, a single mistake in giving a slope during installation of sanitary fixture may create blockage and then leaking of pipes. This not only affects one household or one house but can affect the whole building.

From the survey made to find out the effect of other supporting schemes (financial, material and equipment), the majority of the respondents either disagree or neutral in their opinions. In the overall analysis, while 24% of MSEs confirm the supporting schemes have a positive effect on their performance, 33% of MSEs believe it has neither minor nor moderate effect. Especially for equipment support, only 14% agree the support has an effect on their performance. One of the reasons some of the respondents give for disagreeing is that the equipment they have been provided with through loan gets broken so easily and needs continuous maintenance.

4.4 Defects observed in ‘Gelan I’ and ‘Gelan II’ condominium sites

To identify defects in newly constructed condominium houses, site visits and survey questionnaires for owners and occupants who are living currently on that site were undertaken. The survey was also supported by observation whose guide was developed from the literature. During observation, breakdown of door handles, door mirrors, irregular plastering, loosened fix of the kitchen sink, breakdown of toilet fixtures, and breakdown of terrazzo tiles on the stairs and corridors were highly evident. The houses covered during observation are mostly new houses, which are not yet occupied.

This survey had two intentions first to find out defects observed during the time of handing over the houses. Secondly, to find out defects exists after the occupant move in the house. For this set of questions, owners were selected to identify defects before occupancy and any tenants who are currently living in the houses are selected to find out the defect observed while using the installed fixtures and utilities.

The respondents in this survey are all age groups greater than 18 years old. However, the majority of the respondents are from age 24-35 years with a family size of an average 2-4. All types of houses varying from studio to three-bedroom located on every floor are included in the survey.

According to the first analysis, the most identified defects during handing over, are defects related to sanitary fixtures (as shown in the picture under figure 10). This includes improper placement of kitchen sinks and toilet fixtures, improper functioning of a toilet flush, leaking of plumbing pipes and hand wash basins.



Improper fixing of kitchen-sink fitting



Improper placement of kitchen sink

Figure 11: The picture shows defects on sanitary appliances in a kitchen

Likewise more than 80% of respondents replied that their door handle was not functioning well.



Figure 12: Photographs showing defects on door handle

Door 1 handle is broken and has no mirror and Door 2- the handle is broken

The second most observed defects by the time of handing over are tiles delamination of toilet floor (see figure 12 below), stained concrete ceiling, stained wall, and leaking from shower tray and toilet seat and inward tilted windowsill. The last most observed defects, which still account for 42% of respondents, are broken window handle, ceiling deflection, spalling of concrete ceiling.



Figure 13: The photographs show tiles delamination of toilet floor

Similarly, the defects observed after occupancy of the houses shows there is still a problem of sanitary fixtures and door lock and door handle. Main additional defects identified here is problem related to electric lines (see figure 13 below). According to the survey 89% of respondent observed major and minor defects in their house.



Figure 14: Photographs show defects on electrical fittings.

In addition to the checklist provided some respondents identified defect they observed; for instance breaking down of plumbing parts, problem in the sewage system, and smell through shower tray. Furthermore existence of unfinished works, deflect floor, door without glazing, gutter from the outside splash water to the house, uneven floor level which affects the opening and closing of the door, and levelling problem are common characteristics of the houses they are living in. Some respondents also encountered problems such as the splashing of rainwater through the veranda, socket defects, roof leakage, absence of toilet doors, handrails defect, high sound transmission between adjacent houses, irregularity of wall level and unevenness of wall level.

The other defects that were not provided in the checklist but found to be the main concern of the respondents are defects observed on the common spaces like corridors and staircases. As shown in the picture (figure 14 and 15) most of the floor tiles in the corridors and staircases are broken and delaminated. In addition, the balustrades of the staircases are not fixed firm enough.



Figure 15: Photographs shows defects on corridor floors



Figure 16: Photographs show defects on the treads of the staircase

After handing over of condominium houses in Addis Ababa, owners are obliged to change certain housing parts due to malfunctioning. The finding in this research also shows most people do change some of the housing parts. Almost all door handle and door locks got breaks immediately after the owner start using them. Hence, more than 80% of respondents were forced to change the door handle and the lock.

The sanitary parts are another concern of the respondents but they were not able to change it because of its own complications during maintenance and higher cost requirement. The sanitary parts include toilet seat, hand wash basin, hand wash plump, and kitchen sinks. Chart -3 below shows the housing parts in which majority of respondents forced to change.

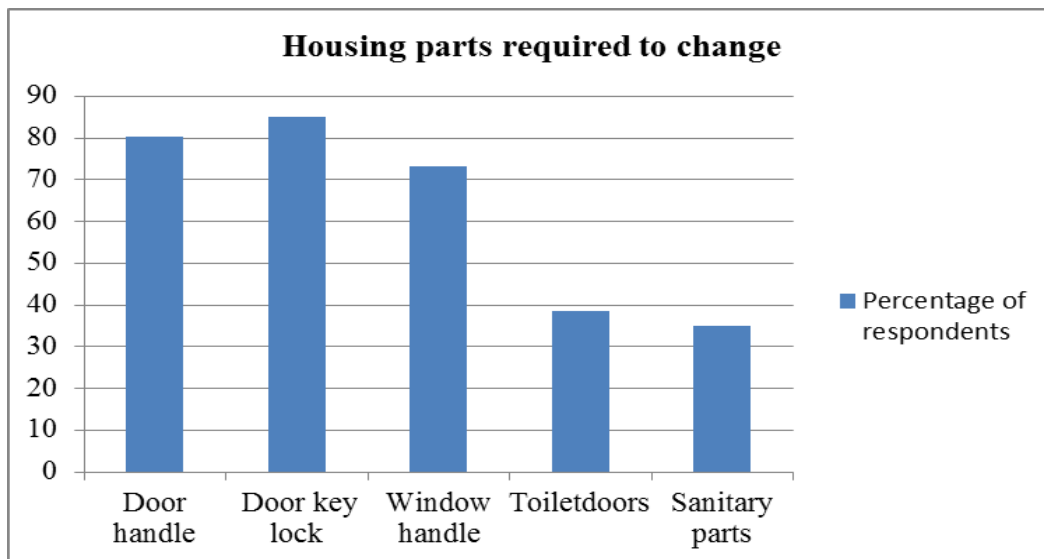


Chart 2: housing parts owners required to change

One of the unique parts of this project is to let owners to execute the finishing work by themselves. This is one of the mechanisms adapted in order to minimize the overall costs of the houses. During finishing works the majority of the owners found the irregularity of wall, floor and leaking of sanitary pipes difficult to perform painting and tiling works. Likewise fixing of inside door was a challenge for most of the respondents because of the levelling problem on the wall and floor.

While living in the house, almost 90% occupants confirm the occurrence of defects. The major defects identified by the occupants and confirmed by the consultant and the HDPO construction officer are defects that relate to sanitary fixtures, electrical utilities, door handles and door locks. Chart-4 below shows the most identified major and minor defects.

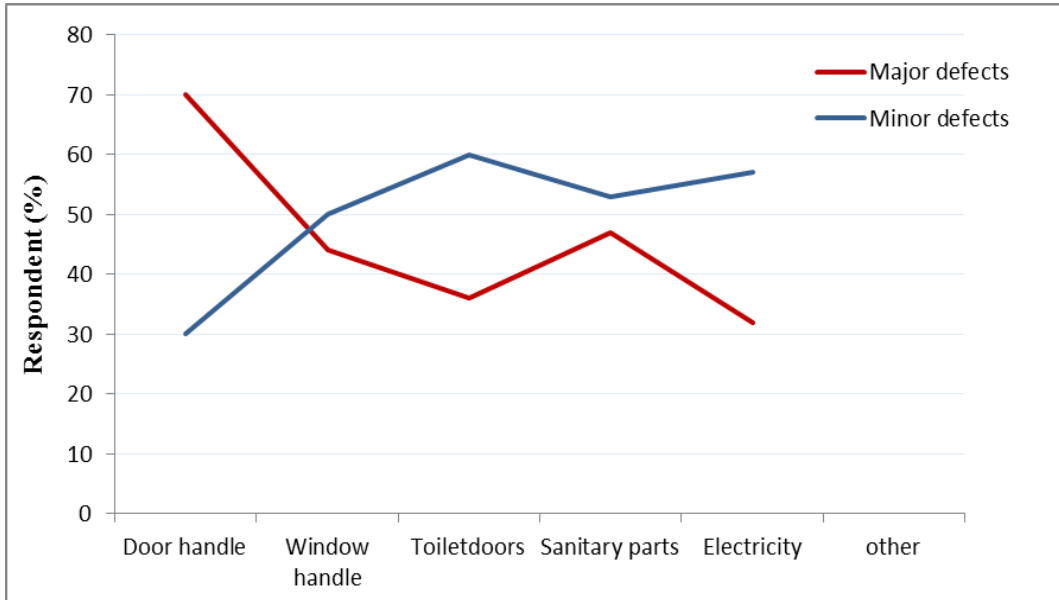


Chart 3: Defects mostly observed by the respondents

It was observed that most of the door handles and key lock were broken and the researcher was able to enter and observe unoccupied houses that had broken doors locks. From the inside as seen in the picture below, most of the toilet's doors were either fixed inappropriately or have broken door handles.



Figure 17: The photo shows a toilet door without the door handle

Besides as shown in the picture below the

windows are fixed improperly thus has wide openings. The majority of windowsill is tilted toward the houses. This together with wider openings exacerbates inflows of rainwater towards the houses.



Figure 18: the photograph shows wide opening left between the window frame and the window sill.

Water can easily penetrate through the hole.

In most condominium houses residents are subject to water leaking problem arises from different sources. Identification of such problems is important because leaking of water not only affect one house but also the entire block. While conducting the survey one of the occupants tells of an incident that had happened to him. The story is narrates in box-4 below.

Incident caused by water leakage

One day while we were asleep I heard an unusual sound coming from the living room and I rushed to see what's happening, I found the living room flooded with water and most of the furniture was soaked by the water. I rushed to the toilet and could not find any open plumbing, I checked the kitchen, and there is no water coming from the kitchen either. I rushed back to the living room; I manage to see the water come from the ceiling. It did not take me a minute to realize it is from the neighbour's house located one level up from my house. The respondent then added that there are many of such cases caused by improper fitting of pipelines and loosen of pipes at the joints.

Source: Narrated from one of the residents living in the condominium house

Where are the seepage usually observed? The survey data reveal that the majority of the seepage comes from window opening, from the roof, and through the door. Besides majority of the respondent, identify leakage inside the kitchen and toilet fittings.

Water and electricity supply problems are a common phenomenon for residences living in condominium houses. Possible sources for the water supply problem as identified by the respondents are blockage and leakage of pipes. Through the analysis made more than 30% of respondents encountered water supply problems because of the blockage and leakage of pipes.

Sudden or frequent fuse circuit breaking, heating of switches and wires are the most identified electricity supply problems. There is also an electricity supply problem caused by electrical sparks or shocks. However, the study did not find out how occupants carry out maintenance.

After identifying defects the next step was to find out how often occupants do maintenance. Accordingly from the survey made majority of respondents, as shown in the chart-5 below, are subjected to maintenance related to sanitary and electrical utilities.

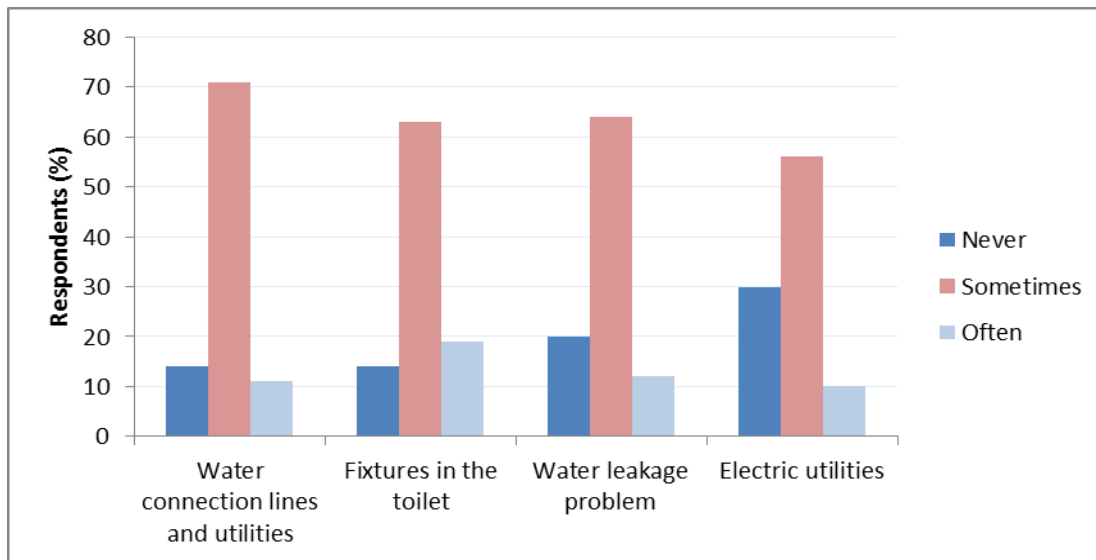
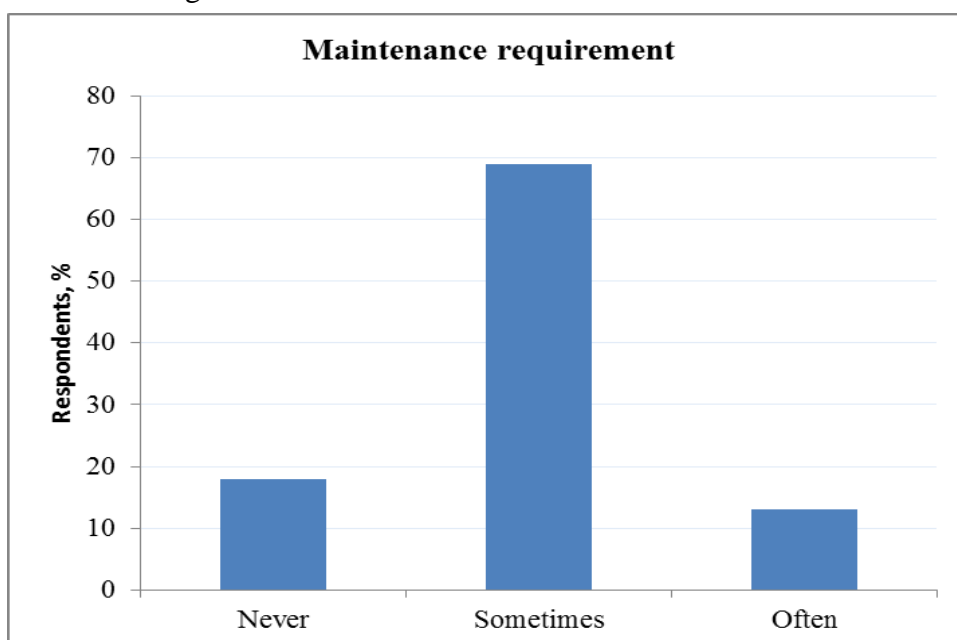


Chart 4: Maintenance conducted for certain defects

Most of the houses included in this research have defects of similar kinds. Thus, residents incurred additional maintenance costs. In general, the research revealed that due to construction defects, the majority of occupants are required to perform maintenance one time or another. The chart below summarizes how often the occupants undertaken maintenance for the defects caused by malfunctioning.



Charts 5: Overall maintenance requirement

Finally, an assessment was made to find out satisfaction of the occupants about the houses they are living in in terms of its construction. Over 70% of occupants rate the quality of houses fair to poor, as a result, the majority of the respondent is not satisfied with the houses they are living in. The next section then will reveal potential factors that might contribute to the construction of less quality houses. By doing so the last research question, which intends to find out the constraints of small-scale contractors and MSEs during the construction process will be addressed in the section proceeding.

Before going to the next section, one might ask how all these defects pass inspections. In accordance with the main contract document, provisional and final acceptance should be undertaken and the necessary correction should be made for the defects observed. The construction officer in HDPO states that they attend both provisional and final acceptance and the consultant noted down the defect observed and forward it to the contractors for correction. Most of the times contractors are willing to do the correction work. However, the final acceptance is undertaken after occupant has started living in the house so it is difficult for them to distinguish defects caused by construction faults. Moreover, he strongly argues that except for minor defects HDPO tries to hand over defect free houses.

4.5 Constraints in the project sites

This section presents the overall picture of the project site during the construction process. The survey was intended to discover constraints that possibly affect the performance of small-scale contractors and MSEs and causes poor quality construction reflected in the previous section. Samples of all stakeholders involved in the construction process participated in this part of the research. The analysis is based on the indicators for the causes of quality defects adapted from chapter two of the literature.

First the overall picture of the project site in terms of managerial, technical, culture and politics and then environment, material and equipment is discussed. Finally, possible constraints of each party that draw from these findings are presented.

4.5.1 Stakeholder managerial

Managerial skill

Both the HDPO's construction officer and the consultant agree that many contractors lack management skill. The consultant points out that there are different types of contractors; some contractors used to be employees and few have some experience in fieldwork before joining this project. Thus, there is knowledge and experience gap between the contractors themselves. Contractors who have experience perform well and carry out their task with due care and diligence. On the contrary, there are contractors who do not feel responsible and may disappear ignoring the contract agreement they signed. The HDPO officer added that many contractors do not prepare schedules for material request and work progress and many are not well organized in their working methodology and keeping data. Furthermore, MSEs' coordinator commented that most MSEs has coordination problem that affects their overall performance at large.

Working atmosphere of the project

As the project involves so many stakeholders, it is necessary to identify the type of relationship and flow of communication among project participant. From the survey data collected to find out when and how often each stakeholders usually communicates, the majority of (more than 70%) MSEs affirm they communicate with HDPO for payment follow up, material request, and for meetings.

Nevertheless, only 52% and 48% of respondents communicate to HDPO when there is a problem and when they have complaints concerning the project respectively. During the communication, 62% of MSEs found the HDPO's office supportive.

All contractors also communicate with HDPO for the same reason as MSEs, in addition, contractors do communicate with HDPO during provisional and final acceptance. Of the respondents 65% of contractors found HDPO's response supportive. According to the survey data collected, more than 50% of the contractors rate their communication with HDPO and consultant very easy but 40% of respondents found it difficult to communicate with MSEs. The rest (60%) rate their communication with MSEs as neither good nor bad. On the other hand, the majority of MSEs who participate in works contract rate their communication with the contractors as positive. Around 50% of MSEs' respondents also rate their communication with HDPO and the consultants as positive.

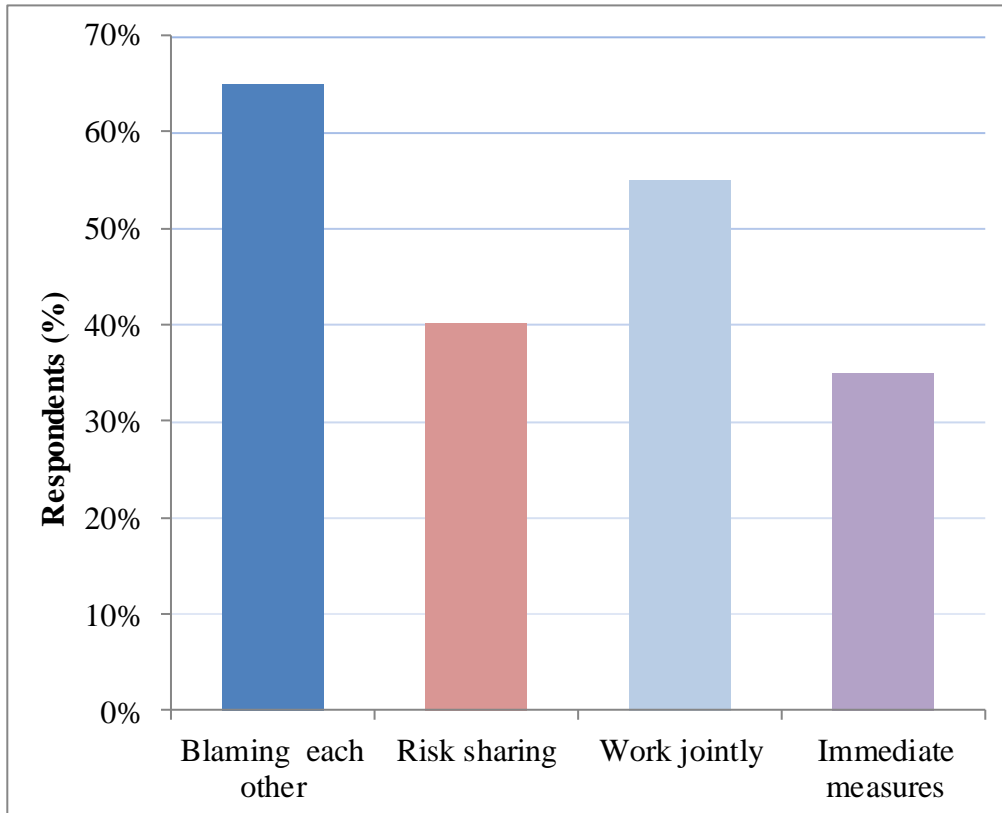
As discussed in the literature review of this paper, type and flow of communication between project participants has a major effect on their performance. The result of the survey shows that both contractors and MSEs do communicate with the HDPO and consultant whenever necessary. But still some contractors and MSEs (almost half of the respondents) are reserved to contact HDPO when there is a problem or complaint. Even if HDPO seems supportive and positive for the majority of the respondents still almost half of the contractors' respondent found communicating with HDPO difficult. Similarly, HDPO rate the overall communication between project participants as medium.

The other most important communication is between contractors and MSEs because they have a tied work relation. In the eyes of the contractors, communicating with the MSEs is difficult while MSEs perceive they have good relation with the contractors. These varying opinions of stakeholders in the communication flow reveal that there is a communication gap between stakeholders involved in the project. Contractors were asked to identify the type of relationships exists on site. According to the majority of the respondents (70%, blaming culture between them and the MSEs does exist but they work jointly with the rest of the stakeholders. The consultants also confirm the existence of blame culture between contractors and MSEs. Both HDPO and the consultant coordinator comment that because of the cooperate contract between contractor, MSE and HDPO blaming culture has improved compared to the previous projects.

As discussed in the literature review (section 2.3) effective problem solving mechanism is one of the indicators for good relationship in the construction process. Thus, when problems arise on site project offices need to solve it at the lowest level as possible. However, 70% respondent of the contractors complains that whenever there are problems or issues that need immediate measures and decisions they always need to wait long. Thus, according to them effective problem solving mechanism is not practiced on site. On the contrary, the consultants argue that they always are on the side of the contractors and MSEs to assist and take any measures as required.

Risk sharing is also one of the most important indicators of performance. The higher risk sharing exists among stakeholders the higher the probability of having a good working atmosphere. However, the majority of respondents of contractors indicated that there is a slight risk sharing practice among the stakeholders. As shown in the chart-7 below only 35% of respondent agree there is a risk-sharing practices. The project coordinator of the consultant on the other hand argued that despite the involvement of the high number of stakeholders in one project, the risk - sharing mechanism does exist. He explained that before taking any decisions we look at the project constraints that might affect the performance of the contractors and MSEs. The coordinator further

explained that they consider things that would not happen in normal building projects unless there is good justification. For instance if a delay occurred, they consider the unavailability of labour, the unavailability of access road and difficulty to work with so many subcontractors before concluding the contractor is the defaulter.



Charts 6: Type of relationship identified by contractors

Relationship among members of MSEs

It is possible that members in one association will not know each other before the association is established. As said by MSEs' coordinator in HDPO office, this might be one of the factors that coordination is not much observed among member in an association. The result shows that 71% the association confirm that some of their members know each other before the association is established. Out of the associations where some of their members know each other, 60% of the association have a very good working relationship.

During the interview with one of the MSEs members, he quoted that it is difficult to reach for a common goal while there are members who does not want to work but want to lean on another member to get money. He also added that this might be the case for many associations to split up. The analysis to find out the type of relationship existing between members of MSEs reveals that majority of MSEs (around 70%) neither have a common objective nor have risk sharing practice. MSEs also find it difficult to work jointly while they have different objectives.

Ambiguities at the project site

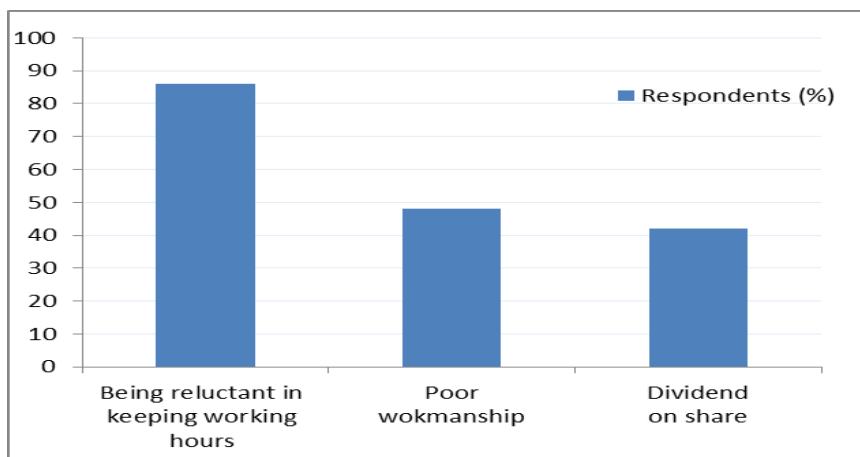
Between project Stakeholders

The project coordinator comments that ‘Ambiguities are sometimes unavoidable especially when there are a lot of actors involve in a project’. The cause may be arising from one or multiple stakeholders; according to the contractor’s opinion (65% of respondents), MSEs are likely the causes for most of the disagreements. In addition, half of the respondents agree that the consultant could also be the cause. According to 65% of respondent from contractors, delay during material delivery, defects on material delivered and poor workmanship are the reasons for the disagreements.

The HDPO’s construction officer accepts the fact that there is delay in material delivery. He also criticized the contractor that the problem would not exacerbate if contractors prepare material schedule regularly and request material in advance. However, most of the time this is not the case except for few well organized contractors. The officer and the consultant agree on the other points that there might be disagreement when defects are observed during material delivery and when defects are observed during the construction process.

Among members of MSEs

While working in groups there might be a high degree of divergences between members in the association, this also is the case for most MSEs participating in this project. MSEs identified possible causes for ambiguities. Of all the identified causes, being reluctant (see chart 8 below) in keeping working hours found to be the most important and common cause for most associations.



Charts 7: Possible causes of ambiguities among member in MSEs

Quality procedure

In construction, the most possible sources of quality defects are poor quality construction materials and poor workmanship. The construction projects in Ethiopia usually follow a number of procedures to ensure the quality production. The most widely used procedures include technical specification prepared as a guideline for detail of the works, undertake tests for major construction material at the time of delivery, close-up inspection, risks allocates clearly, and etc. This section explored the quality practice in this project.

In the project most construction materials are supplied by HDPO itself, for instance cement and prefabricated material supplied to the main contractor. All material except sand are delivered to MSEs-1 for the production of prefabricated materials. The consultant is then responsible for

approval of such construction materials. While conducting site visits it was observed that three types of gravel with similar grain-size dumped side by side in front of one of MSEs-1 (responsible for the production of pre-cast beam) production sites. Concrete mix needs different sizes of gravel to ensure bondage between different materials used. However, what was observed on the site was similar large size gravels and the MSEs were manufacturing pre-cast beam using what is available on site. The supervisor explains the situation that it is difficult for them to reject the material delivered because the client itself supplies the material. He also added that we tried to notify the client (HDPO) about the quality of construction material so many times but the situation never was improved. Conversely the HDPO's MSEs coordinator argues that they are satisfied with quality of material they are supplying thus the office believe there is no need to undergo any tests.

Provoked by this, the researcher asks the coordinator whether tests are available for prefabricated materials or not. Again, the coordinator replied that it is not necessary to undertake tests since the raw materials are delivered by their office. He further explains that in the previous projects they sometimes undergo tests, however, since MSE-1 in this project are new the chance of MSEs to cheat on mix ratio to get money is less. The perception of HDPO is that the support they are giving to MSEs is sufficient to enable them to manufacture quality production. Besides, there are technical persons from consultant and their office to assist MSEs in the process. Keeping this in mind, the researcher continued investigation to find out how this project assures quality construction.

The HDPO's construction officer stated that the consultant is responsible for the approval of material delivered and for supervision of quality works. The procedure the project follows to ensure quality is rather easy, upon completion of work HDPO check the work and give the remarks to the consultant for correction. The officer added that even if there is no quality control team established independently, we have a weekly management meeting held on site to discuss about the progress of work and any problem encountered during the week. The meeting is led by the consultant and involves consultants' project coordinators and management personnel from HDPO.

The project coordinator of the consultant found it difficult to conclude there is no quality control team. He argues that in the weekly meeting they discuss what they observe concerning material delivery, work progress, and quality of the overall construction. In principle there are also meetings which involve contractors and MSEs specially sanitary and electrical workers every two weeks. Thus in those meetings they evaluate the project that makes there is a quality control team.

From the interview made with the HDPO officer and the project coordinator, performance of contractors and MSEs measured and give rewards for good work and penalizes for failure to comply with the contract. The reward is to give contractors and MSEs more jobs and the penalty is to terminate them from the work they were engaged. The performance is measured weekly based on the progress of the work (physical and quality). The coordinator also added that as this is a special type of project with a number of constraints like unavailability of labour and site inaccessibility, they consider those constraints while measuring the performance.

The contractors and MSEs were also asked the availability of Total Quality Management (TQM) in their respective work. Around 60% of respondent from contractors and 76% from MSEs assured there is TQM system in place and its objective and focus is clearly stated. However, around 55% of both respondents affirmed that there is no quality control team independently established. The **majority of the respondents** (contractors) also added that they promote quality construction through quality workmanship, performance measurement, and through implementing quality assurance

system. In addition, they promote quality construction by making corrections for any defects caused by faults of prefabricated construction materials. The respondents also commented that they receive fair feedback from the consultant often but less often from HDPO. Based on the feedback 40% of them review their performance regularly. MSE also receives feedback from HDPO and around 50% of them state they try to improve their performance through the performance review they made regularly.

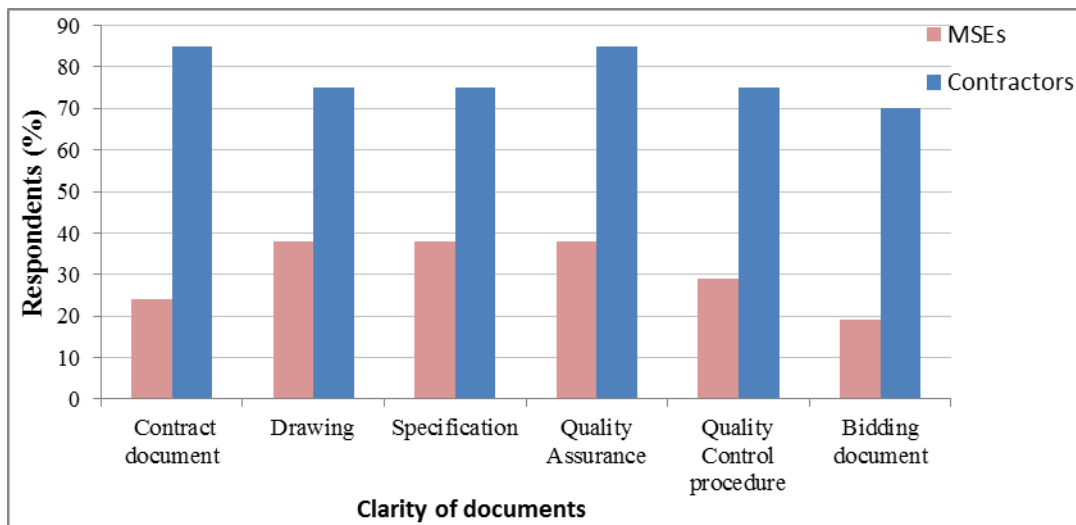
4.5.2 Technical Skill

Consultant and HDPO were asked for their observation on the technical capability of contractors and MSEs. Accordingly, both project coordinator and construction officer responded that the technical skill of the contractors is different among different contractors; some have good technical knowledge while others struggle to apply quality system because of lack of technical skills. Technically majority of contractors have problem in following up on the project as required.

The consultants found the technical skill of most MSEs inadequate. The coordinator of the consultant explains that when MSEs start to work they need to train and guide them. Thus, the engineers from the consultant and the client (HDPO) do most of the job to show techniques and methodologies in the construction processes to the MSEs. The knowledge transfer also depends on MSEs' interest and readiness to learn and accept. The construction officer from HDPO also added that for most MSEs it is difficult to even read drawings and understand the moulds of construction material they are producing.

Both the consultant and HDPO rate technical know-how of the majority of MSEs and some contractors as poor. What do the contractors and MSEs say about their own technical skill? To find out this the survey uses indicators of technical skill adapted from the literature review as a checklist. The most important indicator is how well they understand the contractual and technical documents they are required to use while executing their work.

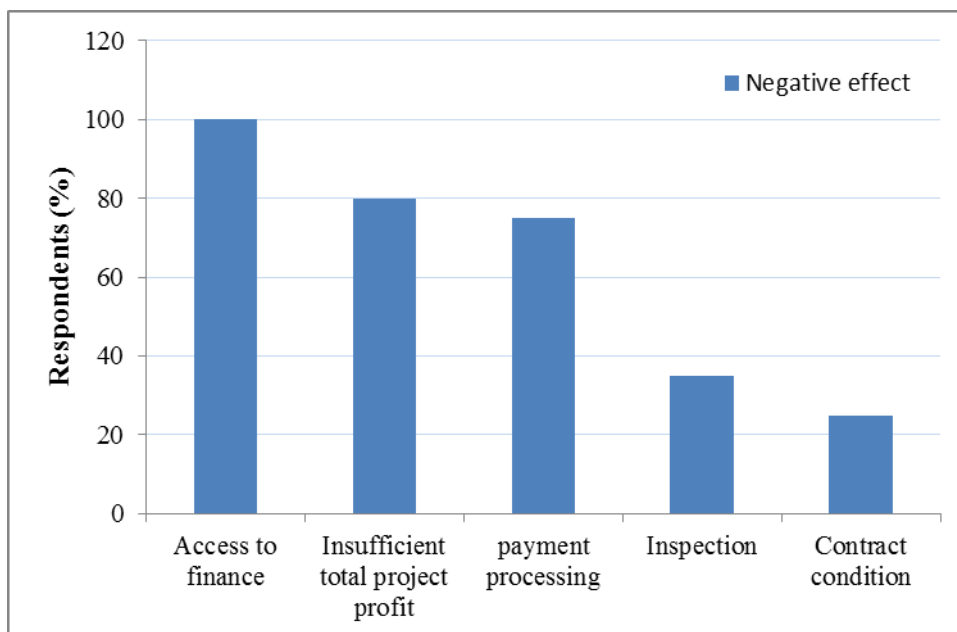
As discussed in sub section 4.2.21.1 contractors have the required educational background and work experience of similar nature. As this is the case, the majority of the respondents (contractor) find the contractual and technical documents clear and easy to understand. On the other hand, in relation to their less educational background and lack of work experience, the majority of MSEs found it difficult to understand the contracts and technical documents. The chart below summarizes the difference in the number of contractors and MSEs agreement on the clarity of different types of contractual and technical documents.



Charts 8: Levels of agreement for clarity of contractual and technical documents

4.5.3 Culture and politics

Although, as discussed in chapter-2 of this paper, cultural and political issues do not expect to bring large effect on project performance they still need to be considered. Using indicators of culture and politics from the literature review, the respondents (contractors and MSEs) were asked different sets of questions. All respondents of contractors agree that lack of access to finance has negative impact on their motivation to work despite HDPO. In addition, long time payment processing and insufficient profit from the project also affect more than 75% of the contractors.



Charts 9: Conditions, which affect contractors' motivation to work

MSEs were asked about what factors affect their motivation most often, the majority of MSEs reply that the profit is too small (only 19% are satisfied), and when they try to request HDPO for unit rate revision, they never get an appropriate response. Besides around 45% of MSEs states that the idleness of equipment, delay in delivery of raw material, contract type, payment condition, accessibility to finance, and a dividend of profit among members in the enterprise, has a large

impact on their motivation to work. Due to HDPO's attention now largely diverted to newly recruited MSEs, the existed MSEs are worrying about losing their jobs; the survey shows that about 53% of MSEs are worried about the sustainability of their job.

As with most construction projects, each stakeholder has their own priorities. Both the consultant and HDPO officer criticize contractors because of their priority to maximize profit at any cost. Even if 55% of contractors agree profit as their priority, also 45% of respondents agree completion on time and gaining experience are their highest priority.

From the survey made on customer satisfaction, more than 75% of occupants (the respondents) are not satisfied with the quality of the houses they are living in. Yet there is no independent office to report their complaint. Thus, customer satisfaction is addressed in the survey because meeting customer satisfaction is one of the performance indicators. The findings include all stakeholders' opinion on customer satisfaction. Accordingly, 80% of contractors mention that customer satisfaction is their priority. The consultant stated that they are trying to meet customer satisfaction through undertaking performance measurement and give the feedback to contractors every two weeks. The construction officer from HDPO added that it is difficult to satisfy all the customers with all the constraints the project have. He also argues that not all the defects inside the houses are caused by construction fault, it could sometimes cause by misuse of the utilities and fixture by the household.

Project coordination is one of the most important factors, which determine the performance of a project. One of the coordinators of the consultant during the interview mentioned how difficult it is to perform coordination work between contractors and MSEs, because MSEs-2⁴ might not be there when the contractor need them. He also added that there are times that they vanished from the site for a long time so that they need to search them through phone. This would affect contractor's performance and might incur additional cost and time.

In general, the findings in culture and politics reveal that there are conditions that affect the motivation of contractors and MSEs, each stakeholder has their own priority, customer satisfaction is not the main concern, and there is a coordination problem between contractors and MSEs.

4.5.4 Environment, material and equipment

Compared to other construction projects in Ethiopia, this project is unique in its character. In this survey stakeholders were asked why they think the project is unique. Almost all of the stakeholders agree that the project is unique because it involves MSEs, has a different organizational structure, adapt different procurement method, and has a capacity-building program. The consultant added that it is not a full construction work agreement; instead, it is a labour base agreement with the main intention of solving the housing problem and unemployment. Moreover, this housing development program is one of the capacity building programs in which the government intends to ensure development of contractors, MSEs and other individuals by investing a large amount of money.

The involvement of so many actors stated under sub-section 4.2.2 and their different contractual relationship makes the project big and complex. As the coordinator of one of the consultants mentioned, the works are scattered to different group of people organizing and managing of such scattered works is difficult.

⁴ MSEs- 2 are MSEs who perform installation works like electrical and sanitary.

Availability of construction material is not a problem for this project because such kind of development programs has priority for purchasing the main construction materials such as cement and reinforcement bars. However, the location and inaccessibility of the project site make delivery of those materials more difficult. Besides it, discourage labour to come and work in this peripheral location of the project site.

Unlike the contractors, MSEs have access to loan to buy equipment besides, HDPO give them assistance when the equipment fails to work. During site visit to the production site of former MSEs, equipment of most MSEs was idle because of less work order from the HDPO office.

4.5.5 Summary of constraints of each stakeholder

The construction industry in Ethiopia as a whole has many constraints with respect to material, labour (skilled, semi-skilled and unskilled), equipment, and finance. Due to the Government's high priority for development, currently huge constructions are undergoing in the whole part of Ethiopia. For instance, construction of infrastructure like dams, bridges, and roads, and construction of buildings like universities, houses and commercial buildings. Undertaking of all the activities at the same time causes the specified scarcities in the construction sector in Ethiopia.

Besides the common constraints all construction projects are facing in Ethiopia, this project has many constraints driven from each stakeholder involved. As discussed in the above sections the project is subject to managerial, technical, cultural and environmental, material and equipment constraints.

The MSEs coordinator identifies MSEs lack of commitment and responsibility, lack of education, lack of experience, lack of work motives, management and technical skill, finance, and coordination between members, as major constraints. Place of work and material scheduling are additional constraints of MSEs.

4.5.6 HDPO's constraints and the consultant

The construction head of HDPO refers that they have work force problems to handle cases of contractors and MSEs. The construction officer also added the shortage of raw material (construction) to supply it to contractors and MSEs, and inconvenience of project site (lack of access road inside the project site). The MSEs' work progress head underline on the short time period given for the training and lack of professionals to give the training as the major constraints to equip MSEs with the required knowledge.

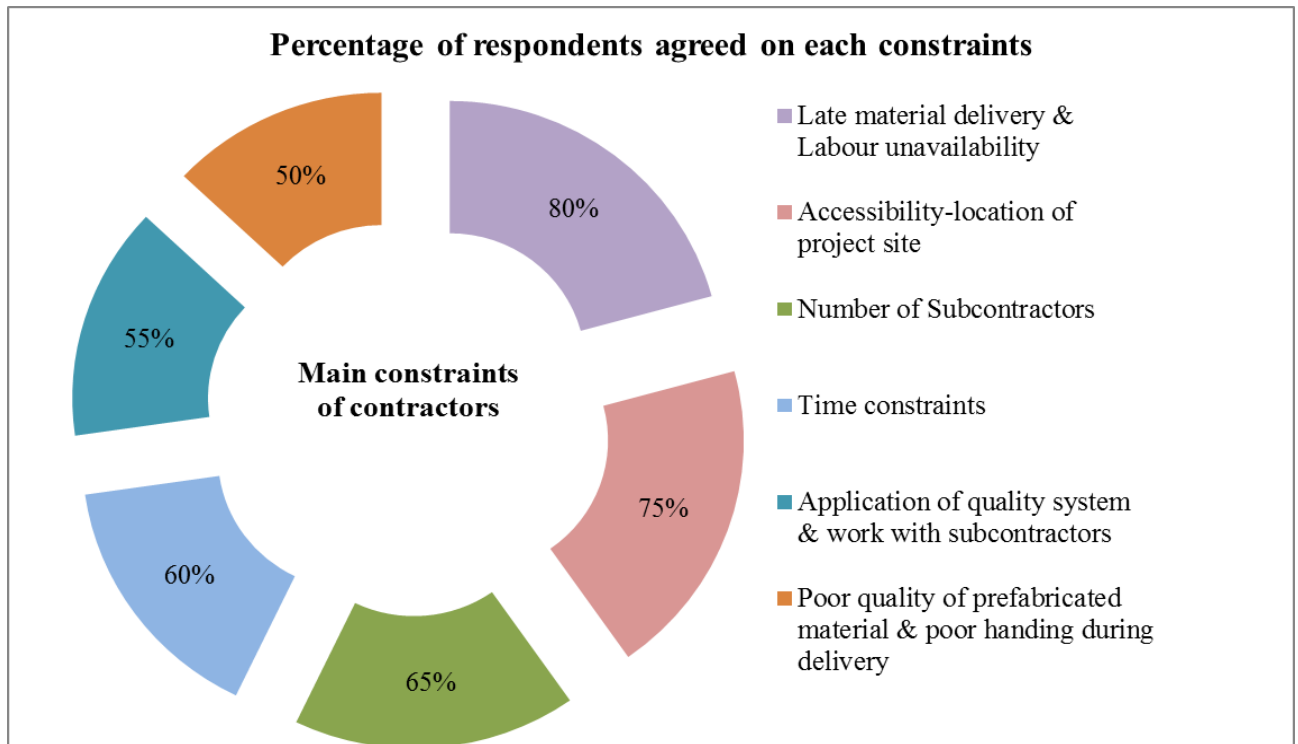
The consultant coordinator on the other hand mentions that, the technical incapability of MSEs cause them to be overburdened with work because they need to show and guide MSEs while performing their task. He also added that the burden would be multiplied when new MSEs engage in the project. The consultant also finds it difficult to manage the scattered works that are handled by different stakeholders.

4.5.7 Contractors' constraints

The HDPO's construction officer states profit maximizing, lack of skilled professional, lack of management skill, and material scheduling is the main constraints of the contractors. The consultant also underlines the lack of capable personnel and lack of construction management as the main constraints of many contractors.

Of the respondents in this survey, the majority of the contractors have an academic background and professional experience in construction. They also confirm that technically, they are not having

major difficulties rather they have other problems that affect their performance negatively. The common constraints that most contractors face are labour unavailability, inaccessibility of the project site, late material delivery and working with large number of subcontractors. The contractors further explain that since construction activities are being undertaken everywhere in the city; there is high demand in both skilled and unskilled labourers. Thus, it is difficult to find labourers with the given labour price in the contract. Besides, labours are not attracted to work on this site due to inaccessibility of the site. The location of the site and lack of access road inside the project site affect their performance due to limited mobility. The chart below summarizes the main constraints that the contractors are facing on site.



Charts 10: Main constraints identified by respondents (contractors)

4.5.8 MSEs' constraints

From the interview made with two members of MSEs and from observation and site visit, it was learnt that MSEs have as well many constraints. For instance, one MSE's who participate in a pre-cast production state that the profit margin is too low and it is really difficult to produce the material according to specification and quality. He also added that the shed they have supplied with is not large enough to produce and store their products, thus most often they wait until the materials transported to the project site before they continue in production. He also mentioned that they have problem in payment processing and communicating with the client.

The other member who produces 'HCB' state that nowadays work order are reduced because of engagement of new MSEs in the project. During site one of MSEs was asked what kind of problem his association is facing, the member said that HDPO does not keep its word, for example in the contract it is stated MSEs are not responsible for handling of prefabricating material during transportation. However, if HDPO found any broken material they deduct the amount from their payment, and when MSEs complain no one give attention to them. Breakdown and idleness of

equipment, shortage of place for works and storage, and supply of raw materials that do not comply with the specification are additional constraints of MSEs-I observed during the site visit.

Chapter 5: Conclusions and recommendations

5.1 Introduction

This chapter presents conclusion arrived based on the research finding in relation to the literature studied in chapter two of this paper which had mainly discussed the constraints of construction industry in developing countries, developmental activities of contractors and MSEs, the practice of prefabricated technology, low cost housing, types of defects in building façade and possible causes of quality defects. The findings were based on the research questions to find out the effect of the capacity-building program on enhancing the performance of small-scale contractors, to find out the main problems observed in terms of quality of construction of the condominium houses and to explore the constraints of small-scale contractors and MSEs face during the construction process. The first part of the chapter comprises the findings of the research questions and the problem statement stated in chapter one. Finally, recommendation for possible solution drawn from the literature or from the observation made.

5.2 Project Structure

The AAIHDP is a government led program administered and managed by the Housing Development Office to supply mass housing stock and to create job opportunities for thousands of people especially the youths. Capacity building programs to train and assist small-scale contractors and MSEs in the construction process support the program. One of the unique characteristics of the program is that it has a variety of large numbers of stakeholders with distinct job specifications. The HDPO project office manages and administers the project as a client. Assisting HDPO in contract administration, the consultants supervise and inspect the works. MSEs are responsible for the production of construction material and installation works. The contractors on the other hand are responsible for the construction of major structures of the building with the material provided to them by HDPO and MSEs.

To ensure affordability of the houses the program engaged labour intensive construction for the production of building components and construction works. This result engaging so many MSEs and small-scale contractors in the project, which then results in complexity of the project. The vast number of stakeholders together with complex work relation makes the management of the project difficult.

As there are so many stakeholders in the project it raises a question whether a good relationship and communication exists or not? The analysis in this research reveals that there is some communication gap among the stakeholders especially between the small-scale contractors and MSEs. In addition, as in many construction projects in Ethiopia discrepancy between stakeholders is a common characteristic of this project. The common causes for the disagreements in AAIHD project are delays in material delivery, defects on material delivered, poor workmanship and unavailability of MSEs from the work place.

The procurement method to engage contractors and MSEs in the project opens a space for anybody who wants to participate in the project. On the other hand, it allows inviting those whose technical capability would not allow them to participate in other project of similar nature. Thus making the

procurement method open has its own benefits and shortcomings in meeting the overall goal of the program. The benefit is that the program can achieve its goal of creating jobs; and the disadvantage is that it allows engaging anybody including those whose technical capability is insufficient to be part of the project. As discussed in the literature review and as reflected in the findings of the research, technical incapability is one of the causes for poor quality construction.

5.3 Capacity Building

In practice and as discussed in chapter two of the literature review, the contractors' development program must include trainings and other capacity building schemes. Further, the training given should consist of both managerial and technical supports of different level based on the level of the contractors. The personal and company profiles show that almost all contractors participated in this research have good educational and professional background. However, most contractors were emerging small-scale contractors who acquired lower grade level according to the Ethiopian Ministry of Works and Urban Development regulations and have a low financial capacity to employ the required skilled professional. The training, as agreed by many contractors should be called training; instead, it is should be called an orientation program to project. The contractors together with HDPO and the consultant agree that the only support provided to the contractor is material support and financial support in a form of advance payment. However, the contractors did not find the financial support satisfactory because neither the financial support is continual nor there is access to loans.

The capacity-building program for MSEs is quite better since MSEs join the program empty handed. At least they are provided with a few days training which includes lessons on how to administer and manage their association. However, the technical support is still controversial and believed to be not sufficient to equip them with the necessary knowledge. Despite their poor educational background, MSEs are left to struggle by themselves to produce quality work with only three to four day lesson on technical support. On the other hand, other supporting schemes like material, equipment and place of work are satisfactory.

Reviewing the overall developmental program supplied to both contractors and MSEs, the mechanism to improve their technical and managerial skills is poorly designed. The training given to MSEs as condemned by the consultants, head of MSEs construction officer in HDPO and MSEs themselves it is not enough or not even close to equip MSEs with sufficient technical and managerial knowledge. Similarly, the contractors are not supplied with the necessary support to improve their performance thus; the majority of contractors are not satisfied with the support.

Therefore, the mechanisms introduced to enhance capacity of small-scale contractors and MSEs are not adequate to bring impact on their responsiveness in carrying out their duty. This shows that the support program design by AAIHDP does not meet the program's objective to develop the technical and managerial capacity of small-scale contractors and MSEs. This also reflected through the quality of the works they are executing and the quality of products there are manufacturing. Most of the houses being built have defects of similar kind, which as believed by the consultants might affect the life span of the buildings.

5.4 Quality Defects

Most of the houses as identified by the occupants, observed by the researcher and later confirmed by the consultant and HDPO have defects. The most identified defects during handing over, are defects related to sanitary fixtures, door handles and locks and vertical and horizontal cracks. Besides owners found the deflection on ceiling, irregularity of wall and floor and leaking of sanitary pipes difficult to undertake finishing works.

After occupancy, more defects such as those related to electrical utilities and sanitary fittings especially leaking of water inside the house start to appear. Leaking of water originates mostly from sanitary lines located in the house or in a neighbour's house, through openings around windows, which should have been sealed, and through roofs. Most of the defects are major defects, which need replacement of the whole or some parts. Accordingly, the study reveals that the majority of respondents are forced to replace their door and window handle, door locks and sanitary fixtures. Similarly, in connection with electrical and sanitary supplies and utilities defects, occupants are forced to undergo maintenance. This in turn brings additional cost of purchasing appliances and repairing the defects.

Associated with all these defects, the households find the quality of the houses fair to poor in terms of its construction. As a result, the occupants are not at all satisfied with the houses they are living in. However, HDPO gives slight concern for customer satisfaction instead give priority to fulfil the policy to supply more houses within a short time period. AAIHDP on one hand does meet its objective on housing delivery but fail to ensure delivery of quality houses .

5.5 Main constraints of project participants

AAIHDP is weakened in providing a financial mechanism to lift up the contractors and in providing adequate training to equip both contractors and MSEs with technical and managerial capability. Because of their satisfactory educational and professional experience, most contractors are rated technically capable to undergo construction. However, due to lack of experience in handling a project of their own, managerial problems were observed on most contractors. In addition, unavailability of unskilled labour, inaccessibility of the project site, late material delivery and working with large number of subcontractors are other constraint that affects their performance. MSEs on the other hand lack both technical and managerial know how, thus it make them incapable to manufacture quality products. They also have constraints caused by the disagreement of membership in the association.

Access to finance, insufficient profit and long payment processing are also the main constraints of the contractor, which affect their motivation to carry out their duties. Similarly, the majority of MSEs were concerned and worried about the stability of their job. This together with insufficient profit from the project, lack of working space and supply of less quality raw material affects their performance negatively.

Administering a large project like this has its own difficulties. The consultants are being helpful in assisting HDPO with supervision and contractual matters however, it does not help the project to avoid major defects during construction. HDPO has its own constraints like lack of work force, lack of construction material and above all lack of applying construction management. These constraints reflect back to the project participants and affect their performance. Non-existence of testing

mechanism for raw materials and prefabricated building components also allows the usage of non-suitable materials in the construction.

The last but important constraints are lack of collaborative working atmosphere at the project site. Lack of good communication between project participants, coordination problem between contractor and MSEs and having different priority might create non-conductive working atmosphere in the project site.

5.6 Recommendation

As concluded in the above sections the “Akaki-Kaliti” condominium project has so many shortcomings especially on its capacity building programs, recruitment of project participants and the management of the project. The sample is too small to conclude that the entire projects AAHDPO running has identical problems and shortcomings. However, it can be an indication for further studies of other sites for comparison and draw conclusion of the overall program.

The training organized for both contractors and MSEs must be based on their level of competence. Because of their poor educational background, the training given to the MSEs need to incorporate technical and management program. In addition, the training should be adequate to equip MSEs to become technically capable to be part of the project and also to increase managerial capability of both small-scale contractors and MSEs. HDPO on the other hand, need to give attention to the quality of the building to avoid defects, which affect durability and functionality of the building.

As the main responsible body for the supervision of quality works, the consultants need to carry out their duties to assure quality construction. They need to affirm that all material delivered to the site need to be tested and approved by their supervisors. They also need to inspect and approve construction works continuously. HDPO also need to make sure that the consultants carry out their duties and responsibilities in accordance with the contract.

The program meets its objective in providing a large number of houses to the urban population and in recruiting a large number of young people. However, it forgoes the need of providing quality houses. Thus, it is important for the program to note that quality construction is also one of the success factors for any construction as well as for the program.

Finally yet importantly, all parties in the project need to coordinate all their efforts for the construction of quality houses for the better and developed housing delivery system.

5.7 Recommended for further study

This study focussed on examining the factors, which lead to poor performance of small-scale contractors and MSEs during the construction process. This is done because they are the key players in the construction process. In addition, it is focused on identifying defects related to poor performance during construction.

Further study is recommended in assessing the constraints of HDPO in administering and managing the project and the constraints of the consultants during the works and material inspection. There is a need to carry further studies to find out how the defects observed during handing over of the houses pass final inspections by HDPO and the consultants.

Additionally, further study is also recommended to identifying the type of defects that are related to structural defects like columns beams and slabs. As a construction engineer, this is important because, this type of defects has a potential to affect the stability as well as the life span of the building. The construction material used in the project need to be assessed and study should be made on the quality of the material provided or to find out whether the materials meet the specification in the building codes of the country.

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6 Annexes

6.1 Annex 1 – Operationalization

Research questions	Variables	Indicators	Sub questions	Sub Questions	Sources
What are the constraints, main challenges small-scale contractors and SMEs face during the construction process?	Stakeholder Managerial	Relationship (mutual objective, gain and pain sharing, trust, no-blame culture, joint working, communication, problem solving, risk allocation)	<p>Network of the parties involved? Work relationship of each parties</p> <p>Mutual objectives were established to benefit to all parties</p> <p>Gain and pain sharing was agreed (do you have agreement to share risks and to give reward? (monetary, satisfaction, ...))</p> <p>A high degree of trust existed in the supply chain (Do you rely on another party for collaboration?)</p> <p>Parties did not blame each other when problems occurred</p> <p>Project participants work jointly</p> <p>Communication between the parties</p>	<p>Do you have work relationship with the contractor, consultant? If yes how do you rate it?</p> <p>committed to this project? What is success of the project for you?</p> <p>Have you ever got accused of default which is not caused by you?</p> <p>-Who cause most of the trouble in the project if any?</p> <p>What types of troubles caused most often?</p> <p>-how do you rate your communication with the rest of the group?</p> <p>Does the contractor allowed to call for meeting?</p> <p>How do you communicate each other?</p> <p>-when you have problem in the middle of work for whom you report first? Does the respond satisfactory and with in time?</p> <p>-what kind of communication if usually observed at site? Open exchange of information, two way communication</p> <p>Is there regular meeting? How often? Who prepare it? Where? Who presents in the meeting? Does the issues to discuss would be transmitted before attending the meeting?</p> <p>Have you ever had informal meeting to discuss problems at site? Or to solve each other problems?</p> <p>Is there regular meeting? How often? Who prepare it? Where? Who presents in the meeting? Does the issues to discuss would be transmitted before attending the meeting?</p>	<p>CD, Consultant, Contractor, SMEs</p> <p>Contractor, SMEs</p> <p>CD, HDPO, Consultant, Contractor, SMEs</p> <p>CD, HDPO, Consultant, Contractor, SMEs</p> <p>CD, HDPO, Consultant, Contractor, SMEs</p> <p>CD, HDPO, Consultant</p>

Research questions	Variables	Indicators	Sub questions	Sub Questions	Sources
What are the constraints, main challenges small-scale contractors and SMEs face during the construction process?	Stakeholder Managerial	Relationship (mutual objective, gain and pain sharing, trust, no-blame culture, joint working, communication, problem solving, risk allocation)	The problem solving mechanism between the parties was effective (blame each other instead of look for solution)	When you need assistance or support whom do you communicate first? do you usually got on time response? -When there is an ambiguity at site how do you solve it?	Contractor, SMEs
			Risk allocation between the parties was clearly stated in the contract and fair	Does any one from the other party approach you for help? What was your respond?	Contractors
			Performance was reviewed and fed fair back on a regular basis		Contractor, SMEs
			Improvement was continuously made during the project		HDPO, Consultant, Contractor, SMEs
			What kind of relationship (win-loss, win win, suspicious of each other		Consultant, Contractor, SMEs
			Reduced subcontractor responsibility	What is your main responsibility?	SMEs
			Poor quality procedure and department	Availability of total quality management system (TQM) in place? What is the main focus of implementation of TQM?	
				Availability of team work to ensure TQM	
				Activities of quality assurance system	
				Who is responsible to develop quality Assurance system	
				What is the main focus of implementation of TQM?	
				Quality control procedures	
				Availability of quality objectives	
				Availability of team work to ensure TQM	
			Lack of process improvement	Does project performance measured on site? If yes, Who is responsible and how often? Do you give feedback to all stakeholders concerned? Does you propose any improvement strategy for poor performance? If yes what is the response?	
		HDPO, Consultant, Contractor, SMEs			
		HDPO, Consultant			
		HDPO, Consultant, Contractor, SMEs			
		HDPO,			

Research questions	Variables	Indicators	Sub questions	Sub Questions	Sources				
What are the constraints, main challenges small-scale contractors and SMEs face during the construction process?	Culture and politics	Emphasis on production and project duration Corruption Nature uniqueness Project size and complexity poor quality and unavailability of resource		What are the most important thing for you to finish your work?	Contractor ,SMEs				
				Have you ever asked a favour from employee of Consultant,HDPO? If yes what kind? When?	Contractor				
				Do you have any other relationship outside of work with the supervisor or HDPO employees?	Contractor				
				Do you believe this project is unique than any other project you used to do? If yes in what way	Contractor ,SMEs, consultant				
				How do you rate the project size?	Contractor ,SMEs				
				Is the project is complex for your scale?	Contractor ,SMEs				
				How do you rate the materials delivered to you	Contractor ,SMEs				
				Have you ever encountered any quality problem on the material delivered to you?	SME, contractors, Consultant				
				Is the site convenient for you? Location? Weather?	SME, contractors, Consultant				
				Do you like working here?	SME, contractors, Consultant				
Does the mechanism introduced to enhance capacity of small-scale contractors and SMEs have impact on their responsiveness in carrying out their duty?	Environment material and equipment	Project Environment		Is the site different from other site? How?	Contractor ,SMEs				
				Is labour available with acceptable price?	Contractor ,SMEs				
				Do think the location, weather...affect your quality of work? If yes how?	SME, contractors, Consultant				
				has your equipment ever been idle if yes why? For how long?	SME, contractors, Consultant				
				did you have any difficulty on obtaining the required equipment for your work?	SME, contractors, Consultant				
				Mechanism	Training system	Material,Equipment specification		Is the standard for using materia, equipment specified in the contract?	CD
								What kind of program you adopt to built the capacity of the contractor,SME?	HDPO
								How do you select the contractors?,SMEs?	TVET
								How do you announce?	HDPO
								Criteria for selection?	TVET
How do you notify selection result?	HDPO								
Who is responsible to organize the training?	TVET								
Type of training?	Contractor ,SMEs								
Did you like the training given?	Contractor ,SMEs								
Is the training is easy applicable, understandable?	Contractor ,SMEs								

Research questions	Variables	Indicators	Sub questions	Sub Questions	Sources
Does the mechanism introduced to enhance capacity of small-scale contractors and SMEs have impact on their responsiveness in carrying out their duty?	Capacity	Skill (Technical and Managerial)		Have you seen any change in technical and knowhow after the training?	TVET
				How do you rate the technical capability of the trainee before and after the training?	
		Financial		Do you gain any technical, managerial knowledge from the training?	
		Customer satisfaction		Do you think the training is helpful to improve your performance?	
				Have you ever applied the knowledge you gain from the training in executing of your task?	TVET
				Do you give financial support to the contractors, SME	HDPO, contractor, SMEs, CD
				What kind, advance payment?,	HDPO
				Are the Contractors, SME satisfied	HDPO, contractor, SMEs
				Have you ever get feed back from the client concerning quality of the project?	HDPO, contractor, SMEs, CD
				Have you ever interested to get a feed back for the work you executed?	HDPO, contractor, SMEs, CD
		Meet stakeholders requirement		Who are attending provisional acceptance?	Consultant
				Who make the remarks for correction?	Consultant
				Do you take pictures during provisional acceptance? would the remarks forwarded to the contractor on time?	Consultant
				Who attends final acceptance? Defects still observed during final acceptance?	Consultant
				Have you ever worried about the out come of the project?	Consultant
				What major defects you have noticed while handling of the house?	HDPO, contractor, SMEs, CD
What main problems were observed in terms of quality of construction of the condominium houses?	Defects of Construction	Wall Cracks		Was it difficult to undergoing finishing works like painting of walls?	Occupants, observation,
				what defects you observed in the toilet and kitchen when you handedover the house?	
				Where all installation were in place and functional?	
				Did you forced to change any of the fixture due to mal functioning	

Research questions	Variables	Indicators	Sub questions	Sub Questions	Sources
What main problems were observed in terms of quality of construction of the condominium houses?	Defects of Construction	Mal functioning of sanitary installation		Did you forced to change any of the fixture due to mal functioning	Occupants, observation,
		Mal functioning of Electricity fixtures		how much cost you to make corrections of defects before doing finishing work? what defects you observed concerning electricity installation when you handedover the house? Have you ever report to HDPO concerning the defects?	
		Maintenance requirement		Did you forced to change any of the fixture due to mal functioning how often you maintain your house? For what reason? For which problems? How much do you spend for maintenance each time?	

6.2 Annex 2 – Questionnaires

Questionnaire for condominium house occupants

Thank you for taking time to fill this questionnaire. This survey questions are a research instrument for the fulfilment of my MSc. Program and of the study on “Impact of project performance on the achievement of AAIHDP: case of condominium house construction in Addis Ababa”. Your responses will be completely anonymous and confidential, and will not be identified by individual. All responses will be compiled together and analysed as a group.

If you were not there or were not responsible to hand over this house from HDPO, please go to part II of this questionnaires.

I. House occupants who handed over condominium house from HDPO

1 General

1.1 What is your sex?

1

Female

2

Male

1.2 What is your age? (in years)?

1

18-23

2

24-29

3

30-35

4

36-41

5

>41

1.3 Do you have any background knowledge about building construction?

1

Yes

2

No

1.4 What is the type of the house?

1

Studio

2

One bedroom

3

Two bedroom

4

Three bedroom

2 General defects on newly handed over house

2.1 What kind of defects you observed when you first handed over the house from HDPO: (more than one choice is possible)

	Yes	No
Broken door handle	<input type="radio"/> 1	<input type="radio"/> 2
Door handle not functioning well	<input type="radio"/> 1	<input type="radio"/> 2
Broken window handle	<input type="radio"/> 1	<input type="radio"/> 2
Tiles delamination (toilet)	<input type="radio"/> 1	<input type="radio"/> 2
Deflection roof	<input type="radio"/> 1	<input type="radio"/> 2

Spalling of concrete ceiling	(1)	(2)
Wall crack	(1)	(2)
Ceiling crack	(1)	(2)
Floor crack	(1)	(2)
Broken window glass	(1)	(2)
Improper placement of kitchen Dishwasher	(1)	(2)
Improper placement of toilet fixtures	(1)	(2)
Stained concrete Ceiling	(1)	(2)
Stained wall	(1)	(2)
Plumping leaks	(1)	(2)
Leaking of shower	(1)	(2)
Leaking of hand wash basin	(1)	(2)
Leaking of toilet seat	(1)	(2)

If other, please specify

2.2 Which of the following housing part you are required or forced to change because of mal functioning?

	Yes	No
Door handles	(1)	(2)
Door Key lock	(1)	(2)
Window handles	(1)	(2)
Window Glass	(1)	(2)
Toilet doors	(1)	(2)
Toilet seat	(1)	(2)
Hand wash basin	(1)	(2)
Plumping parts	(1)	(2)

Kitchen sink

①

②

If other, please specify

I.3 What was the most difficult part when you start executing finishing works?

Yes

No

Irregularity of wall level

①

②

Irregularity of floor level

①

②

Irregularity of ceiling level

①

②

It was difficult to fix inside doors

①

②

If other please specify

Thank you again for taking your time in completing this survey, if you have any questions please do contact me.

II. House occupants who are currently reside in the condominium houses

3 General

3.1 What is your sex?

①

Female

②

Male

3.2 What is your age? (in years)?

①

18-23

②

24-29

③

30-35

④

36-41

⑤

>41

3.3 Do you have any background knowledge about building construction?

①

Yes

②

No

3.4 Are you the head of the house?If not what is your status in the house?

3.5 What is the size of your family living in this house?

3.6 What is the type of housing ownership?

①

Owned

②

Rental

③

Other.....

3.7 What type of house is it?

①

Studio

②

One bedroom

③

Two bedroom

④

Three bedroom

3.8 For how long have you been living in this house?

①

< Half a year

②

1 year < 2 year

③

2 year < 3 year

④

3 year < 4 year

⑤

< 4 year

3.9 Have you ever lived in another condominium houses before you reside here? If yes, please answer question no. 3.9.

①

Yes

②

No

3.10 How was the condition of the defects relative to the current house you are residing?

①

Much worse

②

Somewhat worse

③

About the same

④

Somewhat better

⑤

Much better

3.11 Overall, how would you rate the quality of the building in terms of its construction?

- 1 2 3 4 5
 Poor Fair Good Very poor Excellent

3.12 What is your level of satisfaction about the quality of the condominium houses you are living in?

- 1 2 3 4 5
 Very dissatisfied Dissatisfied Unsure Satisfied Very satisfied

4 General defects observed after residing in the house

4.1 Have you ever detected any construction defects inside the house? If yes, please answer questions 4.1.1 and 4.1.2.

- 1 2
 Yes No

4.1.1 Which of the following defects you observed more?

	Major	Minor	No defects
Door handles	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Door Key lock	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Window handles	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Window Glass	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Toilet doors	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Toilet seat	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Hand wash basin	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Plumping parts	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Kitchen sink	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Electrical utilities	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3

4.1.2 Which of the following housing part you are required/forced to change because of mal functioning?

	Yes	No
Door handles	<input type="radio"/> 1	<input type="radio"/> 2
Door Key lock	<input type="radio"/> 1	<input type="radio"/> 2
Window handles	<input type="radio"/> 1	<input type="radio"/> 2
Window Glass	<input type="radio"/> 1	<input type="radio"/> 2
Toilet doors	<input type="radio"/> 1	<input type="radio"/> 2
Toilet seat	<input type="radio"/> 1	<input type="radio"/> 2
Hand wash basin	<input type="radio"/> 1	<input type="radio"/> 2
Plumping parts	<input type="radio"/> 1	<input type="radio"/> 2
Kitchen sink	<input type="radio"/> 1	<input type="radio"/> 2

4.2 What problems related to water seepage you observed inside your house?

	Yes	No
Leakage through door	<input type="radio"/> 1	<input type="radio"/> 2
Leakage through window	<input type="radio"/> 1	<input type="radio"/> 2
Leakage through roof	<input type="radio"/> 1	<input type="radio"/> 2
Leakage inside the kitchen	<input type="radio"/> 1	<input type="radio"/> 2
Leakage inside bathroom	<input type="radio"/> 1	<input type="radio"/> 2
Leakage from ceiling	<input type="radio"/> 1	<input type="radio"/> 2
Leakage through wall	<input type="radio"/> 1	<input type="radio"/> 2

If other please specify

5 Defects related to water and electricity supply

5.1 Do you have water supply problems because of blockage or leakage of pipes

① ② ③ ④ ⑤
Never Rarely Sometimes Often Always

5.2 Have you ever detected the following electric supply problems in the house?

① ② ③ ④ ⑤
Sudden or Heating of Electric sparks/
Frequent fuse switches shocks High power
circuit breaker and wires consumption No Problem

5.3 How often do you required to maintain water connection lines and utilities?

① ② ③ ④ ⑤
Never Rarely Sometimes Often Always

5.4 How often do you maintain fixtures in the toilet (shower tray, toilet seat, hand washbasin)?

① ② ③ ④ ⑤
Never Rarely Sometimes Often Always

5.5 Overall, how often do you required to maintain due to water leakage problem?

① ② ③ ④ ⑤
Never Rarely Sometimes Often Always

5.6 How often do you required to maintain electric utilities?

① ② ③ ④ ⑤
Never Rarely Sometimes Often Always

5.7 Overall how often do you required to perform maintenance due to construction defects in your house?

① ② ③ ④ ⑤
Never Rarely Sometimes Often Always

If you would like to add, any comment or points that you think it should have been included in this survey, please use the space below.

Thank you again for taking your time in completing this survey, if you have any questions please do contact me.

Questionnaire for SMEs

Thank you for taking time to fill this questionnaire. This survey questions are a research instrument for the fulfilment of my MSc. Program and of the study on "Impact of project performance on the achievement of AAIHDP: case of condominium house construction in Addis Ababa". Your response will be completely anonymous and confidential, and will not be identified by individual. All response will be compiled together and analysed as a group.

1. Sex?

①

Female

②

Male

2. Age in year

①

18-23

②

24-29

③

30-35

④

36-41

⑤

>41

3. What is the highest level of education you have completed?

①

High school
Diploma

②

TEVT
Certificate

③

College
diploma

④

University
degree

⑤

Other
.....

4. What is your position or responsibility in the association?

①

Manager

②

accountant

③

Member

④

coordinator

⑤

Other

5. When does this association established?

①

< 2 year

②

2 year < 3 year

③

3 year < 4 year

④

4 year < 5 year

⑤

> 5 year

6. How many members are there in the association?

7. What is right about members in your association?

Yes

No

I do not know

All member of the group used to know each other prior to forming the group

①

②

③

Some member of the group know each other before

①

②

③

Most group member have worked in construction project before

①

②

③

8. Do you have any work order other than the condominium project?

- 1 Yes 2 No

9. For how many years does your association participating in the construction of condominium house?

- 1 < 2 2 2 year < 3 year 3 3 year < 4 year 4 4 year < 5 year 5 > 5 year

10. In which aspect of the construction work your association performing in this project;

- 1 HCB manufacturing
 2 Slab manufacturing of
 3 Door and window manufacturing
 4 Electricity installation
 5 Sanitary installation
 If other please specify

11. How do you rate the communication between members in your association?

- 1 Very good 2 Good 3 Neutral 4 poor 5 Very poor

12. Which of the following types of relationship between members of your association exists;

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely likely
Blaming each other for mistakes made	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Risk sharing for defects	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Mutual objective for quality production	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
High degree of trust	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Parties work jointly	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Take immediate measure to solve problems	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
If other please specify and categorize them under;					
.....	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
.....	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

13. Were there any ambiguities with in members in your association?

- 1 Never
 2 Rarely
 3 Sometimes
 4 Often
 5 always

14. If there were ambiguities with in members in your association, what were the most significant causes most often?

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely likely
Being late from work	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Dividend on share	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Poor workmanship	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

If other please specify and rank them under:

..... 1 2 3 4 5

15. Are you aware of any activities undergoing on site?

- 1 Never
 2 Rarely
 3 Sometimes
 4 Often
 5 always

16. With which of the following stakeholders, does your association have work relation? (more than one response is possible)

- 1 Contractor
 2 Consultant
 3 Other SMEs
 4 Raw material suppliers
 5 Other

17. How do you rate the communication between you and the rest of stakeholders in the project? (please respond on the category in which you have work relation with)

	Very Negative	Negative	Neutral	positive	Very Positive
HDPO	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Consultant	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Contractor	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

18. When do you usually communicate with HDPO?

- | | Yes | No |
|---|-------------------------|-------------------------|
| When we have problem concerning the project | <input type="radio"/> 1 | <input type="radio"/> 2 |
| When there is a meeting | <input type="radio"/> 1 | <input type="radio"/> 2 |

When we have complaint	①	②
When raw material delivery needed	①	②
For payment processing	①	②

If other please specify

19. How does HDPO's response when you approach them for assistance/help?

①	②	③	④	⑤
Very unsupportive	Not supportive	Neutral	supportive	Very supportive

20. Which of the following conditions has negative impact on your motivation to execute your duties?

	No effect	Minor effect	Neutral	Moderate effect	Major effect
Contract condition	①	②	③	④	⑤
Payment process/schedule	①	②	③	④	⑤
Access to finance	①	②	③	④	⑤
Profit sharing with large group member	①	②	③	④	⑤
Insufficient total project profit	①	②	③	④	⑤

If other please specify and rank them under;

.....	①	②	③	④	⑤
-------	---	---	---	---	---

21. What is your level of satisfaction about profitability of this project?

①	②	③	④	⑤
Very dissatisfied	dissatisfied	Unsure	Satisfied	Very Satisfied

22. Are you worried about the sustainability of your job?

①	②	③	④	⑤
not at all concerned	Slightly concerned	Somewhat concerned	Moderately concerned	Extremely concerned

23. Which of the following conditions has negative impact on your motivation to execute your duties?

	No effect	Minor effect	Neutral	Moderate effect	Major effect
Design complexity	①	②	③	④	⑤
Complexity of the project	①	②	③	④	⑤
Communicate to client	①	②	③	④	⑤
Poor quality material	①	②	③	④	⑤
Late material delivery	①	②	③	④	⑤
Idleness of equipment	①	②	③	④	⑤
Financial constraint	①	②	③	④	⑤
Time constraints	①	②	③	④	⑤
Work in-group	①	②	③	④	⑤
Application of quality system	①	②	③	④	⑤
Poor material handling during delivery	①	②	③	④	⑤
Accessibility-Location/ convenience of project site	①	②	③	④	⑤
Contract type (conditions)	①	②	③	④	⑤
Payment condition	①	②	③	④	⑤
Access to finance	①	②	③	④	⑤
Dividend on profit	①	②	③	④	⑤
Less profitability	①	②	③	④	⑤

If other please specify:

24. Is there any Total Quality Management (TQM) system in place to ensure quality of your production? If yes, please answer question No. 27.

- ① ② ③
 Yes No Difficult to say

25. In which of the following Total Quality Management (TQM) indicators do you agree?

	Yes	No	I do not know
Objective of TQM is clearly stated	①	②	③
Focus of the TQM is clear for me	①	②	③
There is a team establish to ensure TQM	①	②	③

26. Which of the following activities concerning performance improvement exist in your association

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Performance reviewed in a regular basis	①	②	③	④	⑤
Fare feedback of reviewed performance	①	②	③	④	⑤
Improvement was made throughout the project	①	②	③	④	⑤
If other please specify and rank them under:					
.....	①	②	③	④	⑤
.....					

27. Have HDPO ever gave you a feedback concerning the quality of your work?

①	②	③	④	⑤
Never	Rarely	Sometimes	Often	always

28. Have you ever interested to get a feedback about quality of your work?

①	②
Yes	No

29. Have you ever worried about the outcome of the project?

①	②	③	④	⑤
not at all concerned	Slightly concerned	Somewhat concerned	Moderately concerned	Extremely concerned

30. How do you find the training HDPO organized for you?

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
It was important for me to understand the project	①	②	③	④	⑤
It increase my awareness about mass construction	①	②	③	④	⑤

I have gain managerial knowhow	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
I have gain technical knowhow	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
The mechanism was easy and understandable	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Adequate knowledge transfer for the project	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Applicable for this project	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Applicable for other project	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
If other please specify and rank them under;					
.....	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
.....					

31. How do you rate the following types of support you have been given?

	Very dissatisfied	dissatisfied	Unsure	Satisfied	Very satisfied
Financial	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Material	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Equipment	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
If other please specify and rank them under;					
.....	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
.....					

32. Do you think the capacity-building program improved your performance?

<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
No effect	Minor effect	Neutral	Moderate effect	Major effect

If not, what do you think is the reason?

If you would like to add, any final comment or points that you think it should have been included in this survey, please use the space below.

Thank you again for taking your time in completing this survey, if you have any questions please do contact me.

32. How do you find the training HDPO organized for you?

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
It was important for me to understand the project	(1)	(2)	(3)	(4)	(5)
It increase my awareness about mass construction	(1)	(2)	(3)	(4)	(5)
I have gain managerial knowhow	(1)	(2)	(3)	(4)	(5)
I have gain technical knowhow	(1)	(2)	(3)	(4)	(5)
The mechanism was easy and understandable	(1)	(2)	(3)	(4)	(5)
Adequate knowledge transfer for the project	(1)	(2)	(3)	(4)	(5)
Applicable for this project	(1)	(2)	(3)	(4)	(5)
Applicable for other project	(1)	(2)	(3)	(4)	(5)
If other please specify and rank them under;					
.....	(1)	(2)	(3)	(4)	(5)
.....	(1)	(2)	(3)	(4)	(5)

33. How do you rate the following types of support you have been given?

	Very dissatisfied	dissatisfied	Unsure	Satisfied	Very satisfied
Financial	(1)	(2)	(3)	(4)	(5)
Material	(1)	(2)	(3)	(4)	(5)
Equipment	(1)	(2)	(3)	(4)	(5)
If other please specify and rank them under;					
.....	(1)	(2)	(3)	(4)	(5)
.....	(1)	(2)	(3)	(4)	(5)

34. Do you think the capacity-building program improved your performance?

①

No effect

②

Minor effect

③

Neutral

④

Moderate effect

⑤

Major effect

If not, what do you think is the reason?

If you would like to add, any final comment or points that you think it should have been included in this survey, please use the space below.

Thank you again for taking your time in completing this survey, if you have any questions please do contact me.

Questionnaire for Contractors

Thank you for taking time to fill this questionnaire. This survey questions are a research instrument for the fulfilment of my MSc. Program and of the study on "Impact of project performance on the achievement of AAIHDP: case of condominium house construction in Addis Ababa". Your responses will be completely anonymous and confidential, and will not be identified by individual. All responses will be compiled together and analysed as a group.

1. What is your sex?

- 1 Female 2 Male

2. What is your age? (in years)

- 1 18-23 2 24-29 3 30-35 4 36-41 5 >41

3. What is the highest level of education you have completed?

- 1 High school Diploma 2 TEVT Certificate 3 College diploma 4 University degree 5 Other

4. How many years have you worked on construction projects?

- 1 < 2 2 2 year < 3 year 3 3 year < 4 year 4 4 year < 5 year 5 > 5 year

5. For how many years does your company participating in the construction of condominium house?

- 1 < 2 2 2 year < 3 year 3 3 year < 4 year 4 4 year < 5 year 5 > 5 year

6. What is the type of your organization?

- 1 General Contractor (GC) 2 Building contractor (BC)

7. When does your firm established?

- 1 < 2 2 2 year < 3 year 3 3 year < 4 year 4 4 year < 5 year 5 > 5 year

8. What is the category of your organization?

- 1 BC/GC- 6 2 BC/GC- 7 3 BC/GC- 8 4 BC/GC- 9 5 BC/GC- 10

9. Do you have any other project besides condominium?

- 1 Yes 2 No

10. How many of your key employees work in this project?

- 1 < 5 2 5-10 3 10-15 4 15-20 5 <20

11. Which of the following types of relationship between project participants exist that you are aware:

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely likely
Blaming each other for mistakes made at site	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Risk sharing for defects	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Mutual objective for quality of construction	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
High degree of trust	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Parties work jointly	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Take immediate measure to solve problems	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
If other please specify and categorize them under;					
.....	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
.....	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

12. How is the HDPO / consultant response when you approach them for assistance/help?

- 1 Very unsupportive 2 Not supportive 3 Neutral 4 Supportive 5 Very supportive

13. When do you usually communicate with HDPO?

	Yes	No
When we have problem concerning the project	<input type="radio"/> 1	<input type="radio"/> 2
When there is a meeting	<input type="radio"/> 1	<input type="radio"/> 2
When we have complaint	<input type="radio"/> 1	<input type="radio"/> 2

When there is provisional acceptance	(1)	(2)
When there is final acceptance for part of the work	(1)	(2)
For processing payment	(1)	(2)

If other please specify ;

14. How do you find yourself communicating with the rest of the stakeholders participating in the project?

	Very difficult	Difficult easy	Neutral	Very easy	No relation
HDPO	(1)	(2)	(3)	(4)	(5)
Consultant	(1)	(2)	(3)	(4)	(5)
SME	(1)	(2)	(3)	(4)	(5)

15. Does HDPO or consultant ever ask you a favor?

- (1)
Yes
(2)
No

If yes what kind?

16. At the project site, have there been any ambiguities arise between different stakeholders? If No, please do not answer question no. 17 and 18.

- (1)
Yes
(2)
No

17. In your opinion, who do you think is the cause of most of the ambiguities?

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely likely
HDPO	(1)	(2)	(3)	(4)	(5)
Consultant	(1)	(2)	(3)	(4)	(5)
SMEs	(1)	(2)	(3)	(4)	(5)

If other please specify and rank them under;

.....

	(1)	(2)	(3)	(4)	(5)
--	-----	-----	-----	-----	-----

18. Which of the following are the most significant causes for ambiguities?

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely likely
Payment delay	(1)	(2)	(3)	(4)	(5)
Delay in material delivery	(1)	(2)	(3)	(4)	(5)
Defects on material delivered	(1)	(2)	(3)	(4)	(5)
Poor workmanship	(1)	(2)	(3)	(4)	(5)
If other please specify and rank them under;					
.....	(1)	(2)	(3)	(4)	(5)
.....	(1)	(2)	(3)	(4)	(5)

19. In case of any problems, arise at site, how is it solved?

	Never	Rarely	Sometimes	Often	Always
Consultant takes immediate measure	(1)	(2)	(3)	(4)	(5)
Wait for monthly meeting to discuss about it	(1)	(2)	(3)	(4)	(5)
Inform the HDPO and wait for solution	(1)	(2)	(3)	(4)	(5)
If others please specify and rank them under;					
.....	(1)	(2)	(3)	(4)	(5)
.....	(1)	(2)	(3)	(4)	(5)

20. Which of the following conditions has negative impact on your motivation to execute your duties?

	No effect	Minor effect	Neutral	Moderate effect	Major effect
Contract condition	(1)	(2)	(3)	(4)	(5)
Payment process/schedule	(1)	(2)	(3)	(4)	(5)
Inspection	(1)	(2)	(3)	(4)	(5)

Access to finance	(1)	(2)	(3)	(4)	(5)
Insufficient total project profit	(1)	(2)	(3)	(4)	(5)
21. What was your priority in this project?					
	Not a priority	Low priority	Neutral	Moderate priority	High Priority
Complete on time	(1)	(2)	(3)	(4)	(5)
Profit	(1)	(2)	(3)	(4)	(5)
Customer satisfaction	(1)	(2)	(3)	(4)	(5)
Getting experience	(1)	(2)	(3)	(4)	(5)
Quality construction	(1)	(2)	(3)	(4)	(5)
If others please specify and rank them under;					
.....	(1)	(2)	(3)	(4)	(5)
.....					

22. Were the following contractual documents and guidelines clear for you from the beginning of the project up to now?

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Contract agreement	(1)	(2)	(3)	(4)	(5)
Drawing	(1)	(2)	(3)	(4)	(5)
Specification	(1)	(2)	(3)	(4)	(5)
Quality assurance	(1)	(2)	(3)	(4)	(5)
Quality control procedure	(1)	(2)	(3)	(4)	(5)
Bidding document	(1)	(2)	(3)	(4)	(5)
If others please specify and rank them under;					
.....	(1)	(2)	(3)	(4)	(5)
.....					

23. Is there any Total Quality Management (TQM) system in place in this project? If yes, please answer question No. 24.

- 1 Yes
 2 No
 3 Difficult to say

24. In which of the following Total Quality Management (TQM) indicators do you agree?

	Yes	No	I do not know
Objective of TQM is clearly stated	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Focus of the TQM is clear for me	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
There is a team establish to ensure TQM	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3

25. How does your company promote quality construction?

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Quality workmanship	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Performance measurement	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Ask the consultant for any Feedback concerning your workmanship	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Implement Quality assurance system	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Try to make correction for any defects caused by faults of prefabricated material	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
If other please specify and categorize them under;					
.....	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
.....	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

26. What are the main constraints that might influence your performance negatively?

	No effect	Minor effect	Neutral	Moderate effect	Major effect
Design complexity	1	2	3	4	5
Number of subcontractor	1	2	3	4	5
Communicating the consultant	1	2	3	4	5
Poor quality of prefabricated material	1	2	3	4	5
Late material delivery	1	2	3	4	5
Waiting for inspection	1	2	3	4	5
Idleness of equipment	1	2	3	4	5
Work with subcontractors	1	2	3	4	5
Time constraints	1	2	3	4	5
Complexity of the project	1	2	3	4	5
Application of quality system	1	2	3	4	5
Poor handling during material delivery	1	2	3	4	5
Accessibility-Location/ convenience of project site	1	2	3	4	5
Labour availability	1	2	3	4	5

If other please specify and rank them under;

.....	1	2	3	4	5
.....	1	2	3	4	5

27. Which of the following activities concerning performance improvement exist in this project

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Performance reviewed in a regular basis	(1)	(2)	(3)	(4)	(5)
Fare feedback of reviewed performance	(1)	(2)	(3)	(4)	(5)
Improvement was made througout the project	(1)	(2)	(3)	(4)	(5)
If other please specify and rank them under;					
.....	(1)	(2)	(3)	(4)	(5)
.....	(1)	(2)	(3)	(4)	(5)

28. Have you ever interested to get a feedback about quality of your work?

(1) (2)
Yes No

29. Have HDPO ever gave you a feedback concerning the quality of your work?

(1) (2) (3) (4) (5)
Once a month At provisional acceptance At final acceptance Never Other
.....

30. How do you find the training the client organized for you?

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
It was important for me to understand the project	(1)	(2)	(3)	(4)	(5)
It increase my awareness about mass construction	(1)	(2)	(3)	(4)	(5)
I have gain managerial knowhow	(1)	(2)	(3)	(4)	(5)
I have gain technical knowhow	(1)	(2)	(3)	(4)	(5)
The mechanism was easy and understandable	(1)	(2)	(3)	(4)	(5)
Adequate knowledge transfer for the project	(1)	(2)	(3)	(4)	(5)

Applicable for this project (1) (2) (3) (4) (5)

Applicable for other project (1) (2) (3) (4) (5)

If other please specify and rank them under;

..... (1) (2) (3) (4) (5)

..... (1) (2) (3) (4) (5)

31. Do you think the capacity-building program improved your performance?

(1) (2) (3) (4) (5)
 Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

If not, what do you think is the reason?

32. Do you think this project is different compare to other projects? If your answer is yes, please answer question no. 33.

(1) (2)
 Yes No

33. In what way do you think it is unique?

	Yes	No
Involvement of many actors	(1)	(2)
Involvement of SMEs	(1)	(2)
Organizational structure of the project	(1)	(2)
Procurement method	(1)	(2)
Capacity building programs	(1)	(2)
Size of the project	(1)	(2)

If you would like to add, any final comment or points that you think it should have been included in this survey, please use the space below.

Thank you again for taking your time in completing this survey, if you have any questions please do contact me.

Survey questionnaire for consultants

Thank you for taking time to fill this questionnaire. This survey questions are a research instrument for the fulfilment of my MSc. Program and of the study on “Impact of project performance on the achievement of AAIHDP: case of condominium house construction in Addis Ababa”. Your responses will be completely anonymous and confidential, and will not be identified by individual. All responses will be compiled together and analysed as a group.

1. What is your sex?

- 1 Female 2 Male

2. How many years have you worked on building construction projects?

- 1 < 2 2 2 year < 3 year 3 3 year < 4 year 4 4 year < 5 year 5 > 5 year

3. How many years have you worked in the construction of condominium house?

- 1 < 2 2 2 year < 3 year 3 3 year < 4 year 4 4 year < 5 year 5 > 5 year

4. What is the highest level of education you have completed?

- 1 High school Diploma 2 TEVT Certificate 3 College diploma 4 University degree 5 Other

5. What is your position in this project?

6. Which of the following types of relationship between project participant exists that you are aware;

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely likely
Blaming each other for mistakes made at site	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Risk sharing for defects	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Mutual objective for quality of construction	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
High degree of trust	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Parties work jointly	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

Take immediate measure to solve problems (1) (2) (3) (4) (5)

If other please specify and categorize them under;

..... (1) (2) (3) (4) (5)

..... (1) (2) (3) (4) (5)

7. How do you find yourself communicating with the rest of the stakeholders?

	Very difficult	Difficult easy	Neutral	Very easy	No relation
HDPO	(1)	(2)	(3)	(4)	(5)
Contractor	(1)	(2)	(3)	(4)	(5)
SMEs	(1)	(2)	(3)	(4)	(5)

8. When do you usually communicate the contractor?	Yes	No
When they have problem concerning the project	(1)	(2)
When there is a meeting	(1)	(2)
When there is provisional acceptance	(1)	(2)
When there is final acceptance for part of the work	(1)	(2)
For processing payment	(1)	(2)

If other please specify;

9. At the project site, were there any ambiguities between different stakeholders? If No, please do not answer question no. 10 and 11.

(1) (2)
Yes No

10. In your opinion, who do you think is the cause of most of the ambiguities?

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely likely
HDPO	(1)	(2)	(3)	(4)	(5)
Contractors	(1)	(2)	(3)	(4)	(5)
SMEs	(1)	(2)	(3)	(4)	(5)
If other please specify and rank them under;					
.....	(1)	(2)	(3)	(4)	(5)
.....	(1)	(2)	(3)	(4)	(5)

11. Which of the following do you think is the most significant causes for ambiguities?

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely likely
Payment delay	(1)	(2)	(3)	(4)	(5)
Delay in material delivery	(1)	(2)	(3)	(4)	(5)
Defects on material delivered	(1)	(2)	(3)	(4)	(5)
Poor workmanship	(1)	(2)	(3)	(4)	(5)
If others please specify and rank them under					
.....	(1)	(2)	(3)	(4)	(5)
.....	(1)	(2)	(3)	(4)	(5)

12. In case of any problems arise at site, what is your first reaction?

	Never	Rarely	Sometimes	Often	Always
Call a meeting immediately and discuss about it	(1)	(2)	(3)	(4)	(5)
Wait for monthly meeting and discuss about it	(1)	(2)	(3)	(4)	(5)
Inform HDPO and wait for solution from them	(1)	(2)	(3)	(4)	(5)

Resolve at site if it is under your capability 1 2 3 4 5

Transfer the case to head Office, if it is difficult to resolve at site level 1 2 3 4 5

Inform HDPO if it is beyond your organization's capacity 1 2 3 4 5

If others please specify and rank them under;

..... 1 2 3 4 5

13. In your opinion, do you think the project is correctly formulated to suit the capability of the contractors?

1 Yes 2 No

14. Were the following contractual documents and guidelines clear for the contractor from the beginning of the project up to now;

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Contract agreement	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Drawing	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Specification	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Quality Assurance	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Quality control procedure	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

If other please specify and rank them under;

..... 1 2 3 4 5

15. What do you think is the main constraints that influence contractors' performance negatively?

	No effect	Minor effect	Neutral	Moderate effect	Major effect
Design complexity	(1)	(2)	(3)	(4)	(5)
Involvement of so many subcontractor	(1)	(2)	(3)	(4)	(5)
Late material delivery	(1)	(2)	(3)	(4)	(5)
Poor quality of prefabricated material	(1)	(2)	(3)	(4)	(5)
Lack of technical knowhow	(1)	(2)	(3)	(4)	(5)
Lack of managerial experience	(1)	(2)	(3)	(4)	(5)
Poor condition equipment	(1)	(2)	(3)	(4)	(5)
Work with subcontractors	(1)	(2)	(3)	(4)	(5)
Time constraints	(1)	(2)	(3)	(4)	(5)
Complexity of the project	(1)	(2)	(3)	(4)	(5)
Application of quality system	(1)	(2)	(3)	(4)	(5)
Poor handling during material delivery	(1)	(2)	(3)	(4)	(5)
Accessibility-Location/ convenienc of project site	(1)	(2)	(3)	(4)	(5)
Labour availability	(1)	(2)	(3)	(4)	(5)

If other please specify and rank them under;

.....	(1)	(2)	(3)	(4)	(5)
-------	-----	-----	-----	-----	-----

16. Which of the following activities concerning performance improvement exist in this project?

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Performance reviewed in a regular basis	(1)	(2)	(3)	(4)	(5)
Fare feedback of reviewed performance	(1)	(2)	(3)	(4)	(5)

Improvement was made throughout the project 1 2 3 4 5

If other please specify and rank them under;

..... 1 2 3 4 5

..... 1 2 3 4 5

17. How does this project promote quality construction?

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Continuous supervision	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Performance measurement	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Feedback if performance measurement undertaken	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Implement Quality assurance system	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Continuous feedback for any poor workmanship exist	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

If other please specify and categorize them under;

..... 1 2 3 4 5

..... 1 2 3 4 5

18. Is there any Total Quality Management (TQM) system in place in this project? If yes, please answer question No. 19.

1 2 3
 Yes No Difficult to say

19. In which of the following Total Quality Management (TQM) indicators do you agree?

	Yes	No	I do not know
Objective of TQM is clearly stated	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3

Main focus of the TQM is clear for me (1) (2) (3)

There is a team establish to ensure TQM (1) (2) (3)

20. When do you take the remarks on defects most often? Yes No

During provisional acceptance (1) (2)

During final acceptance (1) (2)

If other please specify;

21. Does HDPO present during acceptances?

Provisional acceptance Yes No

Final acceptance (1) (2)

Final acceptance (1) (2)

22. When do you usually communicate the remarks to the contractors that have taken during acceptances?

	Never	Rarely	Sometimes	Often	Always
1-2 days after acceptance	(1)	(2)	(3)	(4)	(5)
< 1 week after acceptance	(1)	(2)	(3)	(4)	(5)
1-2 weeks after acceptance	(1)	(2)	(3)	(4)	(5)

If other please specify and categorize

..... (1) (2) (3) (4) (5)

.....

23. What kind of defects you usually observed during provisional or final acceptance?

	Yes	No
Wall crack	(1)	(2)
Floor crack	(1)	(2)

Delaminated tiles	<input type="radio"/> 1	<input type="radio"/> 2
Roofs leaking	<input type="radio"/> 1	<input type="radio"/> 2
Kitchen fitting	<input type="radio"/> 1	<input type="radio"/> 2
Toilet fitting	<input type="radio"/> 1	<input type="radio"/> 2
Windows handles	<input type="radio"/> 1	<input type="radio"/> 2
Door handles	<input type="radio"/> 1	<input type="radio"/> 2
Ceiling cracks	<input type="radio"/> 1	<input type="radio"/> 2

If others please specify;

24. Are the contractors cooperative to correct the remarks observed during the acceptances?

- | | | | | |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |
| Never | Rarely | Sometimes | Often | always |

25. Has the HDPO ever given a feedback to the contractor concerning the quality of the work?

- | | | | | |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |
| Never | Rarely | Sometimes | Often | always |

26. Do you think this project is different from any other building construction projects? If your answer is yes, please answer question no. 27.

- | | |
|-------------------------|-------------------------|
| <input type="radio"/> 1 | <input type="radio"/> 2 |
| Yes | No |

27. In what way do you think it is different?

	Yes	No
Involvement of many actors	<input type="radio"/> 1	<input type="radio"/> 2
Involvement of SMEs	<input type="radio"/> 1	<input type="radio"/> 2
Organizational structure of the project	<input type="radio"/> 1	<input type="radio"/> 2
Procurement method	<input type="radio"/> 1	<input type="radio"/> 2
Capacity building programs	<input type="radio"/> 1	<input type="radio"/> 2

Project size is too big

①

②

If other please specify and rank them under;

.....
.....

①

②

.....
.....

①

②

If you would like to add, any comment or points that you think it should have been included in this survey, please use the space below.

Thank you again for taking your time in completing this survey, if you have any questions please do contact me.

Interview Questionnaires - HDPO

Thank you for taking time for the interview. This Interview questions are a research instrument for the fulfilment of my MSc. program and of the study on “Impact of project performance on the achievement of AAIHDP: case of condominium house construction in Addis Ababa”. Your responses will be completely anonymous and confidential, and will not be identified by individual. All responses will be compiled together and analysed as a group.

1. Personal

1.1. Name:

1.2. What is your main task in HDPO

2. Employing contractors and SMEs

2.1.

- a) How many small-scale contractors are involved in all projects currently (July 2012)?
- b) How many SMEs are involved in all projects currently (July 2012)?

1.4.

a) Can you tell me how you involve small-scale contractors in the project?

- 1. The selection procedure
- 2. Criteria for selection
- 3. What tender procedure the program follows
- 4. Who are involve in tendering procedure

a) Can you tell me how you involve SMEs in the project?

- a) The selection procedure
- b) Criteria for selection
- c) What tender procedure the program follows
- d) Who are involve in tendering procedure

1.2.

- a) What do you think are the benefits of involving small-scale contractors?
- b) What do you think are the benefits of involving SMEs in this project?

1.3.

- a) What are the shortcomings of involving small-scale contractors?
- b) What are the shortcomings of involving SMEs in this project?

1.4.

- a) Have you ever received complaint from contractors concerning the project?
- b) If yes what was the common complaint of contractors?
- c) Have you ever received complaint from SMEs concerning the project?
- d) If yes what was the common complaint of SMEs?

2. Structure and relationship of different parties involve in the Project

- 2.1. What is the relationship between all parties involved in the project?
- 2.2. What is the involvement of subcontractors in the project/ Main responsibility?
- 2.3. How do you rate the flow of communication between different parties involved in the project?

3. Capacity building

- 3.1. Can you tell me about the capacity-building program for contractors;
 - a) Type (technical, managerial)
 - b) Duration
 - c) Who is responsible
 - d) Have you ever evaluated the program?
 - e) When do they start the job after the training?
 - f) Do you think the support is sufficient enough to allow them execute quality construction?
- 3.2. Can you tell me about the capacity-building program for SME;
 - a) Type (technical, managerial)
 - b) Duration
 - c) Who is responsible
 - d) Have you ever evaluated the program?
 - e) When do they start the job after the training?
 - f) Do you think the support is sufficient enough to allow them execute quality construction?

4. Quality of construction

- 4.1. Is there Total Quality Management, TQM in place during construction? If not please go to question 4.2
 - a) What is the focus of TQM in the construction process?
 - b) What quality control procedure the project follows?
 - c) Who is responsible to develop quality assurance system?
 - d) Is there a team established from each party to ensure TQM?
 - e) Is the objective of TQM is clearly stated?
 - f) Is there a strategy for continuous improvement of quality?
- 4.2. Is there any other quality control mechanism in the construction process?
- 4.3. Is there quality control mechanism for prefabricated construction materials? If yes please answer question a and b,
 - a) What quality control procedure you follow?
 - b) Is there a strategy for continuous improvement of quality?

- c) Who is responsible for delivery of prefabricated construction material?
- d) Have you received any complaint about the quality of prefabricated construction material from the contractor/ consultant?
- e) Have you had any problem related to hauling and handling of prefabricated construction materials during transportation?

4.4. How do you rate the supervisor?

4.5. How do you allocate risks to different parties for the defects during construction

- a) Contractors
- b) SMEs
- c) HDPO

4.6. Who is liable for defects observed during defect liability period?

4.7. Can you tell me about the warranty of construction?

5. Customer satisfaction

5.1. What mechanism do you use to make sure the contractors are performing well?

- a) Do you measure performance? If no please go to question No. 5.2
- b) How do you measure performance?
- c) How often does performance measured?
- d) Do you give the feedback to the contractor? If yes answer question no. e
- e) Are improvement observed after the feedback?
- f) Is there a reward for performing well?

5.2. Are you attending provisional/ final acceptance?

5.3. Concerning defects of construction, what do you observe most often?

5.4. How do you make sure the remarks taken, are later corrected?

5.5. Are you aware there is quality problem in the newly constructed condominium houses? If yes please answer question no. a-d

- a) What do you think is the reason for the quality problem?
- b) What measures did you take to resolve the quality issues?
- c) Have you ever received any complaints from the occupants about the quality of condominium houses?
- d) Is there any office to handle such a case?

5.6. Do you consider satisfying occupants concerning providing quality houses?

5.7. Have you ever considered getting a feedback from occupants about the quality of houses you delivered?

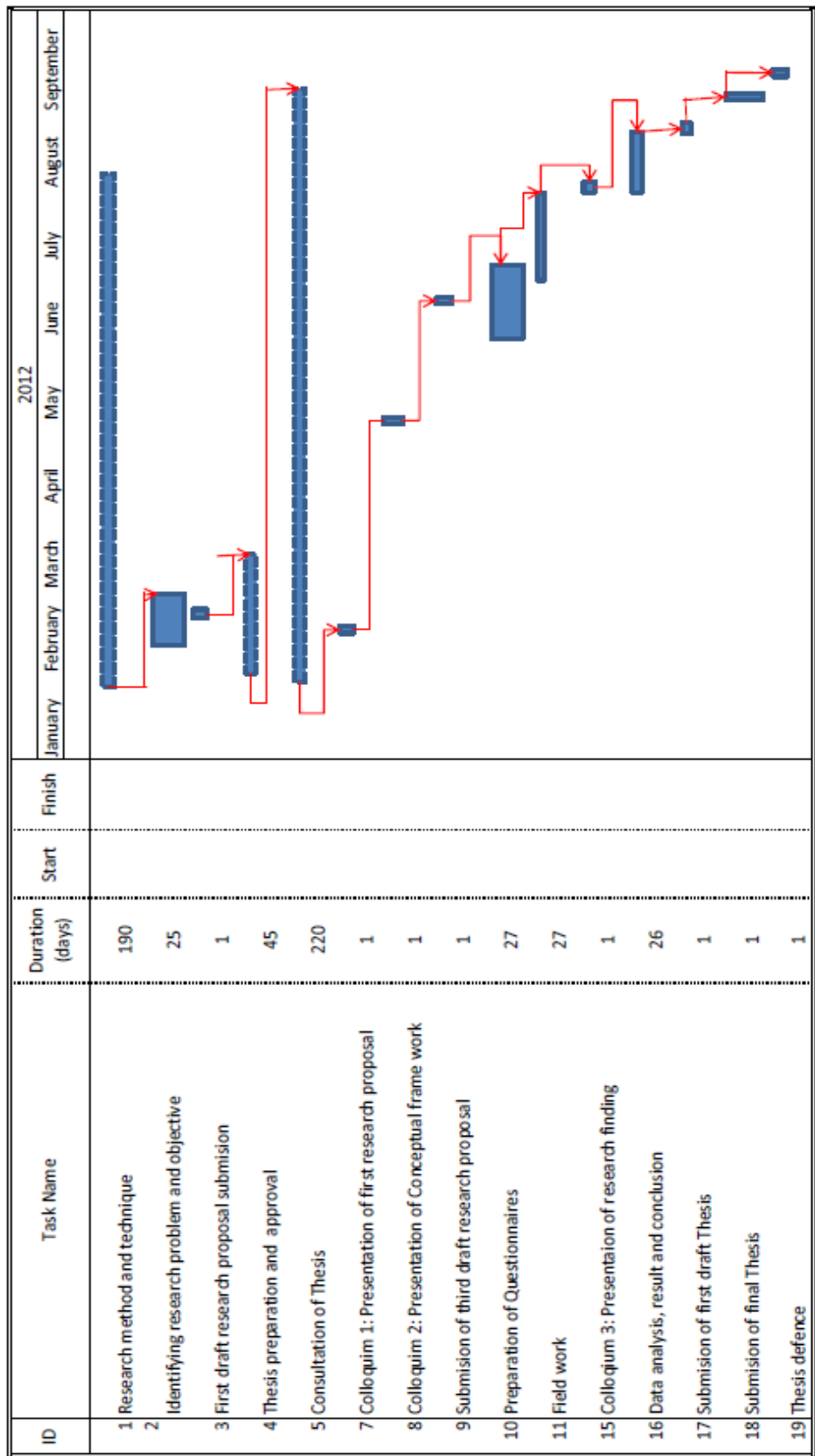
Would you like to add, any final comment or points before we conclude the interview?

Thank you again for taking your time for the interview, if you have any questions please do contact me.

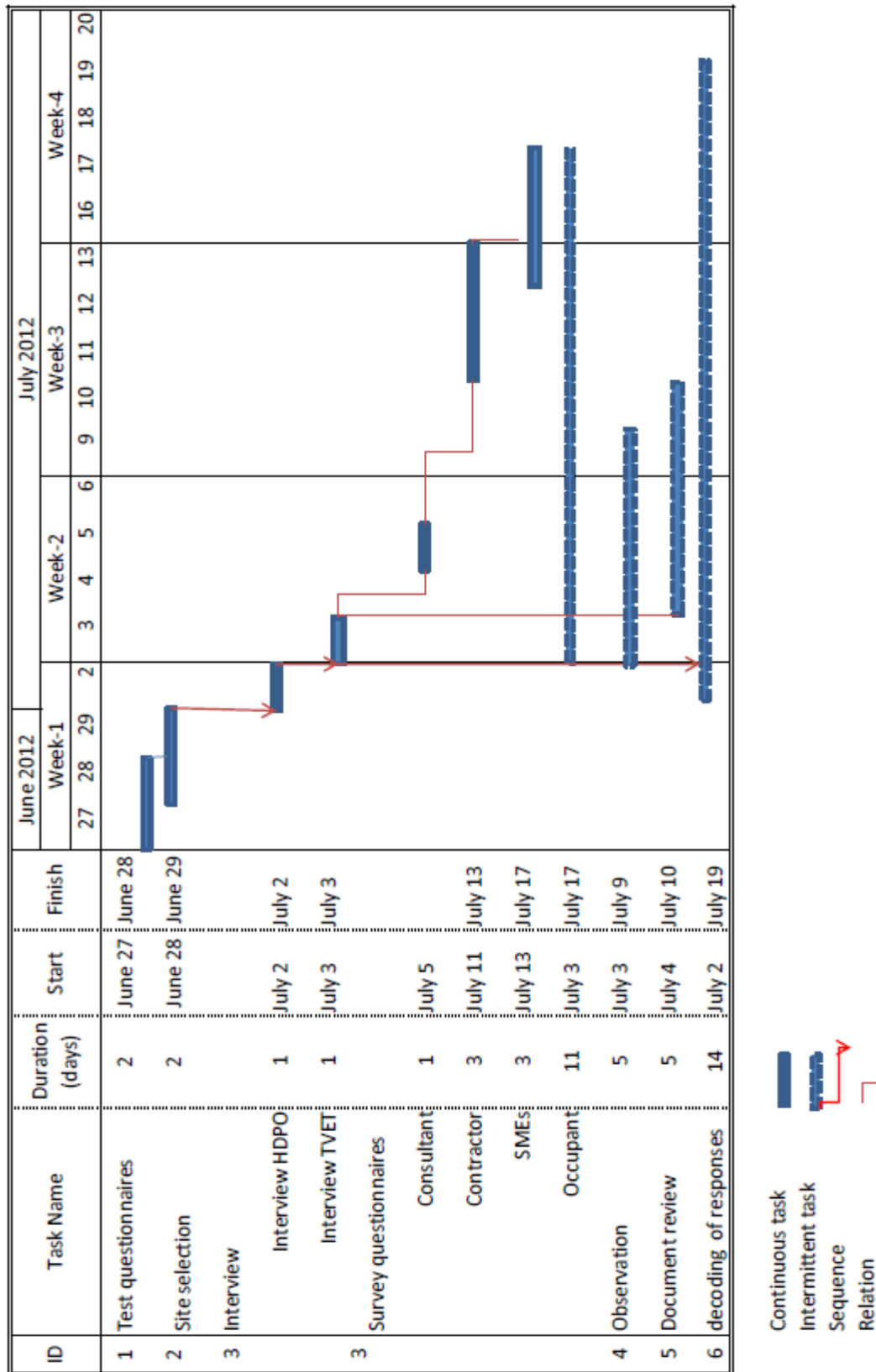
Checklist for observation

Common Defects in building	Building facade									
	Wall	Floor	Tiles	Metal sheet	Glass	Roof	Window		Door	
							Glass	Handle	Glass	Handle
Cracking										
loose plaster in ceilings										
Delamination										
Surface appearance <ul style="list-style-type: none"> • Surface abrasion • Surface etching 										
Corrosion										
Physical appearance <ul style="list-style-type: none"> • Dentage • Deflection • Warping and buckling 										
Water penetration/damp										
Sealant defects										
Staining										

6.3 Annex 3 – Research Time Table



6.4 Annex 4 – Field work Time Table



6.5 Annex 5 – Field data analysis

HDPO and Consultant officer profile

Name	
Mr. (Ato) Habtewolde	Construction follow up and supervision officer
Mr. (Ato) Ato Rezene	Head of MSEs' work progress
Mr. (Ato) Ato Negash	MSEs follow up and work progress coordinator
Mr. (Ato) Ato Yared	Consultants' project coordinator
Mr. (Ato) Ato Tefera	Consultants' project coordinator

Respondents of contractors

Respondent	Sex		Age (Year)				Highest level of education			Construction Work experience (year)	
	Female	Male	24-29	30-35	36-41	>41	College diploma	University degree	MSc	4<5	>5
No. of respondents	4	16	3	10	5	2	3	14	3	5	15

Organization profile of contractors

Respondents' No.	Type of Organization		organization Category/ grade(BC/GC)		Firm's establishment (year)			Other project	Years of participate in condominium projects			No. of key employees of the company		
	GC	BC	3-4	5-6	3-4	4-5	>5	Besides condominium	2-3	3-4	4-5	<5	5-10	15-20
	11	9	3	17	3	10	7	20	4	9	7	9	9	2

MSE personal profile

Respondents' No.	Respondent sex		Respondent Age					Respondent Highest level of education			
	Female	Male	18-23	24-29	30-35	36-41	>41	High school	TEVET certificate	collage deploma	univerisity degree
	5	16	2	11	1	4	3	11	4	5	1

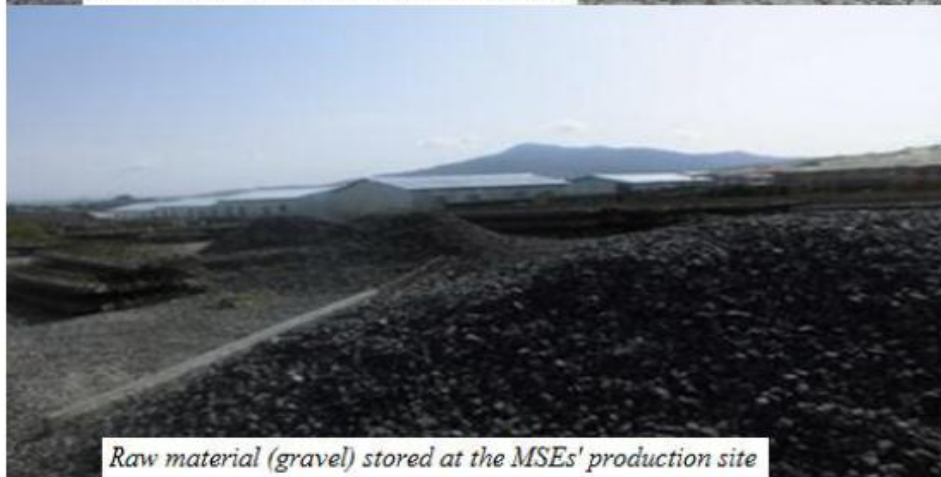
Company profile of MSEs

Respondents' No.	Enterprise's establishment (year)					No. of members		Work order besides condominium		Works specialization						Years of participate in condominium projects				
	<2	2-3	3-4	4-5	>5	10	Other*	Yes	No	HCB	Precast slab	door & window	electrical	sanitary works	Concrete Pipe	<2	2-3	3-4	4-5	>5
	2	6	1	3	9	11	10	7	14	6	2	1	6	6	2	3	4	5	1	8

6.6 Annex 6– Pictures at MSE production sites



Pre-cast production-MSEs production site



Raw material (gravel) stored at the MSEs' production site



HCB manufactured and stored at MSEs shelter (production Site)



Precast beams manufactured by MSEs



Concrete pipes production- MSEs 'prodction site



Men wokng at MSEs production stie



HCB production- MSE's production site

