

Product Design Practice Within Micro and Small Enterprises (MSEs) in Kenya

**Case Study of Sofa-design Entrepreneurs in
Gikomba Market, Nairobi**

Lilac Adhiambo Osanjo
MSc Entrepreneurship, BA Design (Hons)

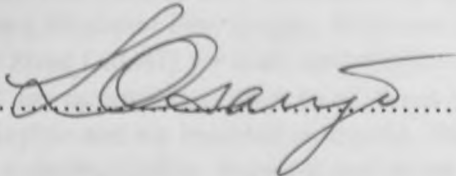
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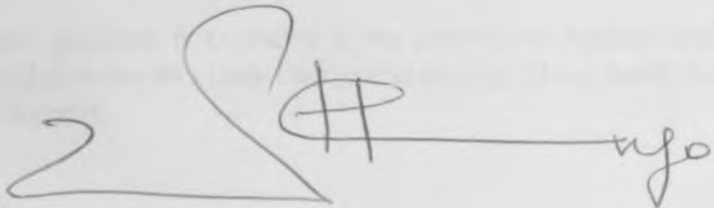
DECLARATION

I Lilac Adhiambo Osanjo do hereby declare that this thesis is my original work and has not been presented for a degree in any other University.

Signed:  Date: 26/07/2012

DECLARATION OF THE SUPERVISORS

This thesis has been submitted for examination with our approval as University supervisors.

Signed:  Date: 26/07/2012

Dr Walter H. Onyango

Signed: Dorothy McCormick Date: 30-07-2012

Professor Dorothy McCormick

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Lilac Osanjo

DEDICATION

To all the designers who have gone before me and those who are starting the journey towards academic fulfilment.

To my Mum and Dad Mr Japheth Ang'ila Ating'a and Mrs Deborah Aomo Ang'ila, you are the best!



ON CHAIRS

The curve of the back rest, the twist of a leg or the angle of the seat reflects the state of mind of the designer and the skillfulness of the carpenter. A chair can tell stories of the society it was born. ...The extended Kenyan family of chairs will tell you their life story, starting with their conception out of creative minds, their birth in skillful hands and their lives underneath you and me.

Quoted from VITI EXHIBITION, March 2011, Michael Joseph Centre, Nairobi.

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ABSTRACT

The Micro and Small Enterprise (MSE) sector contributes significantly to Kenya's industrial and economic growth. If provided with the right support and an enabling environment, MSE can enhance their product design and development capabilities, enhance capacity and create products that enhance the well being of their customers while promoting environmentally sensitive production. However, in the context of this research, it is established that MSE sofa-design entrepreneurs do not have sufficient design considerations in the manufacture of sofas, thus leading to sofa seats that do not adhere to user centered or sustainable design principles. The scope of design reaches far beyond the development of decorative products, as design touches on every aspect of human life - health, agriculture, medical services and the higher end technologies. In the design process, designers incorporate various product needs including anthropometrics, style and functionality. Using a mix of design research (proximology) and social research (ethnography) methodologies it focused on five sofa-design entrepreneurs who are owner managers and who undertake design of sofa. The research was mainly qualitative guided by the research questions. Data collection included non-participant observation, informal and formal interviews and focus group discussions. The research findings show that informal apprenticeship remains the most common way in which skills are transferred within the MSE sector. Within sofa making, the informal apprenticeship training focuses on technical skills and equipment and machinery handling. However, it does not include design knowledge and skills. As a result, a Design Extension Services (DES) model is proposed within Gikomba market in which entrepreneurs can receive training and where stakeholders can gather for purposes of improvement in MSE design skills and knowledge.

ABBREVIATIONS AND ACRONYMS

ATA	-	Aid to Artisans
CITC	-	Christian Industrial Training Centre
DLC	-	Design Life Cycle
EPZA	-	Export Promotion Zones Authority
ESAURP	-	Eastern and Southern African Universities Research Programme
HPD	-	Hybrid Product Development
IDIL	-	Instituto de Desenvolvimento da Industria Local, Maputo
ITDG	-	Intermediate Technology Development Group
KEBS	-	Kenya Bureau of Standards (KEBS)
KIPPRA	-	The Kenya Institute of Public Policy Research and Analysis.
KIPI	-	Kenya Industrial Property Institute (KIPI)
KIRDI	-	Kenya Industrial Research and Development Institute
KIE	-	Kenya Industrial Estates Limited
KNBS	-	Kenya National Bureau of Statistics
MS	-	Micro and Small
MSE	-	Micro and Small Enterprise
MSME	-	Micro, Small and Medium Enterprises
NEMA	-	National Environmental Management Authority
NGO	-	Non Governmental Organization
ODM	-	Orange Democratic Movement
ROK	-	Republic of Kenya
SES	-	Small Enterprise Sector
SMEs	-	Small and Medium Enterprises
SSEs	-	Small Scale Enterprise(s)
TCC	-	Technology Consultancy Centres, Ghana
TIVET	-	Technical, industrial, vocational, entrepreneurship training institutions
4K	-	4K refers to the MSE 2030 initiative for growth that is spearheaded by four institutions namely, KIRDI, KEBS, KIPI and KNFJKA.

1.0 INTRODUCTION

1.1 *Background and Setting*

The role played by micro and small-scale enterprise sector in Kenya is critical to the development of the country. The sector contributes significantly to employment creation and it is estimated to contribute about 18.4% of the GDP; it provides employment to over 28% of the total employment. The country's population is 39 million out of which 18 million are "economically active" that is able to undertake economic activities (ROK, 2010). In addition, the Economic Recovery Strategy estimates that out of the 500,000 jobs the economy is expected to create per year, 88% will come from this sector (Vision 2030, 2007) to deal with unemployment situation especially among the youth. The government recognizes that the formal sector has limited employment opportunities; there is an increase in costs of living and increasing poverty levels. In 2007, an estimated 7 million persons were working in the MSE sector (ROK, 2008), supplying most of the products that are consumed by the majority of the population. This is no different from other developing countries where small and medium sized companies are considered as important drivers of economic growth (Andradi, 2008) and it was noted that micro and small enterprises (MSEs) are the most important source of informal employment. Men account for 60 percent of total MSE employment, while women account for 40 percent. In 2002, the government recognition of the importance of the MSE sector, created a new MSE policy framework that placed MSE development in line with the national economic growth goals, employment creation, income generation, and poverty reduction (ROK 2006, ILO 2005). Sessional Paper No. 5 of 2005, Vision 2030 and the National Industrial Policy (2005) outlined the growth strategies for the country with reference made to the micro and small enterprises. The Government set up the Micro and Small Enterprise (MSE) department at the Ministry of Labour with the mandate to provide a legal framework for the implementation of MSE policies and development strategies (Gatiba, 1999).

Design has been described as the conception and planning of the artificial in reference to new things that have not been seen or experienced. It provides the thought which guides the making of all products, whether by individual craftsmen or mass production techniques: material objects, verbal and visual communication techniques, organized activities and services and complex systems or environments for living, playing, working, and learning (Buchanan, 1995 b). The most

common design disciplines of study known today include fashion, graphics, interior, web, jewelry, and industrial design. Furniture design, which is the broad subject are in this thesis, has a history based on craft production and architecture. This is largely based upon the historical development of furniture especially in Europe and is reflected in the way furniture designers are educated in design schools and schools of architecture (Kristensen and Lojaco, 2002). Furniture can also be approached as engineering and/or industrial design and the depth and definition depends on the understanding of different design schools and designers, some of whom even within the same country may have quite different understanding of what it is and what it entails (Hussain, 2006).

Every person has the ability to design, but design theorists caution that that ability is hierarchical and that, to qualify as a "designer" individuals must undergo certain levels of training (Moggridge, 2008). To achieve a level of design ability where, as described earlier, one is able to engage in design as well as explain their activities and process, designers have to be trained. Formal training is available in institutions such as the School of The Arts and Design (University of Nairobi) and Kenyatta University. The Interior design graduates from these institutions provide interior design and landscaping services that includes furniture design. Vocational training in design does not exist in Kenya. However, most vocational training institutions provide training in carpentry and metal work. Apprenticeship, which is the preferred form of skill transfer in the micro and small enterprise sector focuses on technical skills and machine operations. The training however does not have a design component.

Most of the furniture in most households in Kenya is produced by the MSE sector. Wood is the main raw materials for tables, beds, chairs and sofas that are produced by the sector. The MSEs can be found in most residential estates and in the market places. In order to investigate the design skills acquisition process among MSEs, this research selected sofa-design entrepreneurs within Gikomba market and examined their training, design processes, apprentices, and general environment.

1.2 The Problem Statement

The research problem that was addressed is that MSEs entrepreneurs are producing large quantities of sofa, however, little is known about what design process they follow and how they

acquire the requisite design knowledge and skills. Casual observation in most urban areas in Kenya reveals that the MSEs sofa enterprises are present in the estates, roadsides and almost everywhere. The thriving sofa manufacturing industry provides sofas to most households in Kenya and it provides employment to many young people who would otherwise be unemployed. However, a large percentage of these sofas produced by MSEs have certain design flaws. It is exhibited in a lack of variety, poor quality and finishing, lack of standards, and no consideration for users. The design process that MSEs follow has not been articulated; the sofa styles change with observable frequency but the factors driving the change were not known.

Leading from the sofa manufacturing question is the problem of how the MSEs acquire design information, knowledge and skills. Empirical research shows that MSEs acquire their skills through apprenticeship. However, the effectiveness of apprenticeship in delivering design knowledge and skills to trainees had not been established.

Empirical research on design process or methods has focused on the work of experienced designers who are able to articulate their process. Very little research has been undertaken on the process employed by non designers. Researchers such as Chen (2008) and Cross (2007) encourage designers to undertake research on processes that are used by non designers to inform training and development of the design discipline. Cross (2007) outlines three major branches of design research as *design epistemology* - study of designer ways of knowing; *design praximology* - study of the practices and processes of design; and *design phenomenology*. This research falls into the category of design praximology, investigating the practice of design by micro and small entrepreneurs to answer to the need for more information on MSE design processes. A detail of the research design is presented in Chapter 5.

1.3 Objectives of the Research

The main objective of the research was to better understand current practice and processes of sofa design in micro and small enterprises and to determine ways of improving practice.

Specific objectives are:

1. To determine the MSE sofa design process.
2. To establish the determinants of MSE sofa anthropometrics and dimensions?
3. To establish the challenges faced by the MSEs in sofa design.
4. To establish how the MSEs acquire the knowledge and skills for sofa design.
5. To propose a model for appropriate design skill acquisition for MSEs.

1.4 The Research Question

The main research question that the research sought to answer was:

How can the current practice and processes of sofa design in micro and small enterprises be better understood and how can the practice be improved?

Specific questions are:

1. What is the MSE sofa design process?
2. What are the determinants in MSE sofa anthropometrics and dimensions?
3. What are the challenges faced by MSEs in sofa design?
4. How do the sofa-design entrepreneurs acquire the knowledge and skills for sofa design?
5. What is an appropriate model for design skill acquisition for MSEs?

1.5 *Significance of the Research*

Micro and small enterprises are the main suppliers of sofas to the majority of the Kenyan population. Therefore, through an understanding of their product design practice, we can influence MSE design trainers, trainees and other stakeholders.

This research adds to the literature on the existing MSE product design practice that is not readily available. This research focused on sofa makers, but the information collected can be used to understand other MSE product design activities in other products such as metal products and garments.

Designers have been accused of serving only 10% of the world's customers by developing products and services exclusively for the rich. A revolution is needed to reach the other 90% (Polak, 2007). This research provides an alternative dimension in product design research that has hitherto put emphasis on the product rather than the producer; on the processes of experienced and professional designers rather than "other" designers or "non-designers." This is an effort to provide information from the "other" perspective of entrepreneurs who are not themselves "designers."

MSE sofas are widely consumed in the country and therefore there is need to highlight design issues such as those of quality and standardization. Good quality sofas will benefit the consumers by improving their experience and health, economic, political and social life.

Information presented here is relevant to MSE policy makers concerned with the development of products from the MSE sector. It is also relevant to agencies and institutions that contribute to MSE development.

The information is important for researchers who can use it as a basis for further inquiry. This will help in building a pool of information on this very important sector and the design discipline.

1.6 Scope

The scope of the research covered MSE entrepreneurs engaged in sofa design industry. They are engaged in making design decisions for the sofas. This includes the style, dimensions, identity, ornament and upholstery. From these entrepreneurs, the sofa design is quickly copied and disseminated to other entrepreneurs.

The geographical scope covers Gikomba market that is situated to the Eastlands area of Nairobi. Preliminary observation established that the market was the source of most sofas that are consumed in Nairobi and exported to many parts of the country. There are many entrepreneurs engaging in sofa production by roadsides around the country, but close observation, revealed that the entrepreneurs engaged in piecing together or finishing of sofas after purchasing the frames, fabric and ornaments from Gikomba market.

There are many products produced by the MSEs in general and Gikomba market specifically. From the market, one can get metal boxes, "jikos," tin cans, chicken feeders and heavy duty machinery. However, sofa was selected because it is widely consumed, the design practice can be best articulated and the design and manufacturing process requires a certain level of skill and knowledge. Sofa design, manufacture and marketing are an elaborate process involving many micro entrepreneurs, the research focused on the frame makers as they make critical design decisions that impact on the sofas' outcome.

1.7 Research Design

This research is first and foremost a design research contributing knowledge to the discipline of design. Based on grounded theory building that is "bottom - up" seeking to let theory emerge from field research. Design research methods were complemented by social research methods adopting mainly qualitative approach of ethnography, observation and interviews. Product anthropometrics was used to analyze the sofa which was the selected product area. Quantitative data collection and presentation was applied in cases where it was found necessary especially in circumstances where it was the most appropriate approach. Data collection included a mix of observation, field notes,

informal interviews, focus group discussions, photography, video recording and anthropometry. Data is presented in narrative, photographs, tables and diagrams. Details of the research design are discussed in Chapter 5 on the methodology.

1.8 Terminologies

Part of the challenge in this research was to delimit “terminologies” and their application. The terms of design, designer, designing; the use of the term “entrepreneur” coupled with the terms of product development, product design and design process.

Design is a term that refers both to a product and a process, in which for example, we can see a car that is designed, where the car is a result of a complex activity that involves research and experimentation. On the other hand, closely related to the design of a product, is design as a process, providing solutions to problems that are not necessarily tangible products. Design activities and processes are varied and multi disciplinary in nature. The multi-disciplinarity is not simply a broadening of the range of subject areas included within the design portfolio, although these cover a wide range of designing and design related activities including information design, fashion, textiles, industrial design and engineering design; it also includes many other aspects of technology as well as embracing architecture, environmental design and conservation. The extent to which any design activity can capitalize upon and realize the potential of multi-disciplinarity is dependent upon the ways in which it can relate to, have access to and draw upon these various fields, both within and across the design disciplines and with other disciplines (Allison, 1995).

Anthropometry: Actual chair dimensions are determined by measurements of the human body - anthropometric measurements. The two most relevant anthropometric measurements for the chair design are the popliteal height (sometimes called the stool height) and buttock popliteal length. Mass produced chairs in America are typically 17 inches (43 cms) high (www.en.wikipedia). For someone seated, the buttock popliteal length is the horizontal distance from the back most part of the buttocks to the back of the lower leg. This anthropometric measurement is used to determine the seat depth and mass produced chairs are typically 15-17 inches deep (40 cms average). Ergonomics considers how comfortable and suitable the chair is for the occupant. Ergonomic design

distributes the weight of the occupant to various parts of the body. A seat that is higher results in dangling feet and increased pressure on the underside of the knees. A lower seat may shift too much weight to the “seat bones.” Reclining seats typically have at least shoulder height backrests to shift weight to the shoulders instead of just the lower back.

Design practice: Practice is defined as a repeated exercise in the production of products or services. It is also performed habitually as a means to improve the skill. In the context of this research, it is assumed that design practice best describes the nature of the activity of realization of sofas within MSEs best. This is slightly different from the process above that appears to be more defined and “academic.” Therefore, the research used practice to encompass the design activities that define, affect, impact on and lead to the production of MSE sofas.

Design process: The design process is a step-by-step sequence of activities that is necessary to realize pre-determined design goals. Typically, it begins with the definition of the design problem that makes the brief. In the design process, there are clear goals and outputs. And, trained designers are able to follow a design process, and, reflect upon the process. The process itself is a design research that prescribes the “ideal” route to realize a product, system or model. **Design process** can be articulated and is undertaken in phases such as the five-step design process. In the process designers are expected to explore the materials, technology, customer needs and production.

Design Research: The development, articulation and communication of design knowledge. This knowledge is sought from people, processes and products, (Cross, 2007). An example of subjects of design research can be – *how people design*. This suggests, empirical studies of design behavior, and it includes theoretical deliberation and reflection on the nature of design ability. In *processes*, design research can focus on methodology – the study of the processes of design, and the development and application of techniques which aid the designer. This revolves around “modeling” for design purposes. Modeling is the “language” of design it encompasses de-codification of ideas and creation of visual units that can be presented as for example form or

system. Product is a tangible form whose realization takes into consideration materials and finishes. Exemplars contain knowledge and understanding of the “ideal” of what a product should be. In art and design, there are “masterpieces” that embody the ideal for example in furniture. These masterpieces have attributes or features that inform other pieces. Craft based design or traditional crafts derive their value from the knowledge implicit within the objects themselves and which determine their shapes and how they should be made and used (Cross, 2007). Cross (2007) identifies the three major branches of design research as design epistemology - study of designer ways of knowing; design praximology - study of the practices and processes of design; and design phenomenology. This research falls into the category of design praximology, investigating the practice of design by micro and small entrepreneurs.

Engineering design: The process of applying various techniques and scientific principles for the purpose of defining a device, process, or a system in sufficient detail to permit its physical realization. It is a purposeful activity often directed towards fulfilling human needs (Chao and Ishi, 2005, Reymen 2001).

Entrepreneurs: This is a term that has been used interchangeably and in various contexts. It refers to entrepreneurs who work within the sofa-making industry. The four subjects who are the focus of this research are entrepreneurs and more. They are the owner/managers and make decisions within the enterprise that affect the sofa designs such as the raw materials, financial resources and technology. They are also carpenters and are leaders within the Gikomba furniture industry. The sample have been referred to as **sofa-design entrepreneurs** in order to distinguish them from the other entrepreneurs.

Micro and small enterprises (MSEs): The number of employees which is between 1 and 10 is the determining feature of micro enterprises. It is sometimes referred to as Informal sector, (providers of economic activities, unregistered in the state accounts, and not being subjected to formal rules of contract, licensing, labor inspection, reporting and taxation, ILO, 1991) and/or Jua Kali. Small enterprises employ between 11 and 49 employees. The different terminologies mainly depend on the context, country or

specific program under discussion. MSEs is preferred in this thesis because it aptly defines the focus group as recognized by the Government of Kenya (Sessional Paper No. 2 of 2005) and secondly, the design issues within MSE may vary with the other clusters or groups depending on environmental factors. So, the sofa-design entrepreneurs belong to the MSE sector.

Sustainable Product Design: A design activity that takes into consideration and tries to balance the environmental, social and economic factors in creation of products. In terms of sofa, some of the features of sustainable sofas are: **Durable, long lasting sofas.** Sustainable Design Association of Australia promotes the use of durable, long lasting materials as a way to reduce carbon foot prints that emanate from disposed sofas and the long haul trucks that transport wood. Closely related to this is avoiding of wastage of materials – raw materials used for production.

User- Centered Design: The design of products that can be used by specific users to achieve desired goals with effectiveness, efficiency and satisfaction in their given contexts of use. It is participative; system oriented; and acknowledges human diversity (Pheasant, 1996). **Customer needs in terms of space and use.** Designers such as Levy (Levy, 2002) are conscious of the customer use of the sofa. He concentrates on sofa beds that are adaptable for his customers' needs and use. In Kenya recently, Futon sofa was promoted for people with limited living spaces. It is an adaptable sofa that has its roots in Japan and is able to transform into a bed or comfortable seat. In some cases, customers seek sofas that reflect their personalities, tastes and financial status.

Universal Design: Universal Design (UD) addresses design in the context of needs for all people – of all ages and abilities; associated with Design for All; Design for the Broader Average and Inclusive Design (Coleman, 2006).

1.9 *Delimiting Research Parameters*

The research is directed by the objectives. However, there is need to delimit the research for various reasons. The research is limited to MSE entrepreneurs who have the ability to translate an idea or picture from whatever source, into a sofa. The entrepreneurs were also selected because they make decisions within the enterprises as managers or owners. They are therefore referred to as “sofa-design entrepreneurs.” It is appreciated that that there is a lot of copying of style within the MSEs, however, these four entrepreneurs were found to be the sources of some of the sofa designs. The majority of entrepreneurs that practice sofa making are not involved in origination of the styles, this majority was not the focus of this study and therefore, in establishing the sofa-design entrepreneurs, the research narrowed down to five entrepreneurs operating within Gikomba market.

There is considerable research on design process and its impact on the success of products taken from the point of view of designers who are able to outline the process of design. However, this research approached design from the perspective of “non-designers.” The approach is supported by theorists who appeal to designers to research on design by non-designers as a way of contributing information, developing the design discipline and informing design training. This orientation is different from that taken by most design researchers who examine design from the perspective of designers and engineers.

1.10 *Organization of Thesis*

The introduction and background to the research problem have been presented in Chapter 1. A detail of Gikomba market which is the study area is provided in Chapter 2. In Chapter 3 design theory and research is discussed. Much of the design research hitherto undertaken has been guided by social research methods, however this research is a mix of design and social research methods and discusses the similarities and differences between social and design research. This research belongs to the category of generative design research and it anchors on inductive logic from the social sciences, developing grounded theory. Chapter 3 outlines apprenticeship training that is the main method of skill acquisition within micro and small enterprises. It also provides examples of

different methods that have been used to impart design skills to MSEs. The methodology and research design are presented in Chapter 5. The research draws its methodologies from social science research, scientific research and design research methods. The relationship and application of these methods is discussed. Findings from the research are presented in the next two Chapters 6 and 7. Chapter 6 focuses on design practice while Chapter 7 focuses on skill acquisition. Conclusions and recommendations are presented in Chapter 8. A model of design extension services that is proposed in answer to the main research question and areas of further research is discussed in Chapter 8. Areas of further research have also been presented.

2.0 GIKOMBA MARKET

2.1 Overview

Since independence in 1963, Kenya has had several strategies for economic growth with the most recent one being the Vision 2030. Kenya has a population of 38.3 million people. In the Vision 2030, Kenya is expected to scale up economic growth from 6.1% in 2006 to 10% by 2012/2013 through to 2030 (Republic of Kenya, 2007). The major challenges for growth include poverty, fast population growth, limited resources and environmental degradation. The capital is Nairobi City that has a population of over 3 million persons which makes it the most populous city in East Africa and one of the most prominent ones in Africa politically and financially. Nairobi is the regional hub for business including finance, transport and health. The Nairobi Stock Exchange (NSE) is one of the largest in Africa. Youth (below 20 years of age) make up about 60% of the population of Kenya. Many of these youth are unemployed. In the Vision 2030 it is recognized that science, technology and innovation are important in a modern economy with the aim of developing a skilled population that can create, share and use knowledge well. In order for MSEs to be absorbed in the development process, the Vision acknowledges that they require training and that this training will be provided at different levels through community polytechnics, technical, vocational and educational (TVET) training institutions. Small special economic clusters and small and medium enterprise parks will serve as seed beds of "Kenya's industrial take-off" (Republic of Kenya, 2007).

Gikomba market has its origins in the colonial period in which racial segregation was practiced. The market was a meeting place for the indigenous people where they would congregate to socialize, have their hair cut and get services such as repair of clothes and shoes. The market is still an important meeting place. The open field adjacent to it is the stronghold of opposition politics where major rallies are held periodically.

The Gikomba Jua Kali sector is important because: it provides self employment (it is estimated that there are 50,000 people living and working in the market, (Mathenge, 2010), it uses scrap metal usually recycled; it provides cheap products that includes knives, pans, basins, drums, "pangas" and "jikos"(see Appendix VII); it improves the standard of living of many people through sale of these products; the industries do not depend on electricity for production or other resources like

the larger enterprises; it does not require specialized skills and require little capital to start up (GOK 2006). Most products consumed by the majority of households in Kenya today, originate from the Jua Kali sector. This includes furniture and sofas.

Gikomba market in Nairobi is one of the centres where Jua kali furniture makers cluster to produce sofas and other furniture. It is conveniently situated to the Eastlands of Nairobi (Figure 2-1) that is inhabited mainly by the middle and lower income earners. It is the largest one-stop market for most goods and services from and into Nairobi City. Gikomba market lies within four city constituencies namely Kamukunji, Pumwani, Makadara and Makongeni. The Nairobi River passes right through the centre of the market.

Figure 2- 1: Gikomba market within Nairobi



Source: Google Maps, www.google.co.ke. (Retrieved on 3rd July 2009)

The “Machakos” Bus terminus situated next to Gikomba market ensures that traders from all over the country can access the market with ease. Heavy goods are transported on hand carts and loaded onto the country buses.

The streets within Gikomba market are narrow and ordinarily impassable for most vehicles. Trucks and heavy vehicles bring in goods in the night so that they can access the interior of the market with ease. This means that trading at Gikomba market is a 24 hour operation.

Security in Gikomba market is not very good with many jobless youth trying to eke out a living even through illegal means such as pick pocketing and conning innocent traders. However, stall owners have formed groups and hired security guards. Typically, the people are hostile to outsiders whom they suspect are not there to trade. They may harass such persons.

Gikomba market is periodically in the news because of fires that cause immense damage to the enterprises that are crowded. Almost every year, sometimes twice, the market burns down and unfortunately the furniture makers suffer big losses because their site is difficult to penetrate with fire engines (see Appendix IX). In 2009 the market burnt down in January (Biomndo 2009) causing the traders huge losses and September 2010 that same story hit the headlines, causing untold damage to the furniture industry there.

2.2 *Economic Activities*

The market is the source of various goods and services including fresh food produce into and out of Nairobi ranging from household goods, hardware, fish, vegetables, and most of the second hand clothing famously known as "*mitumba*."

Gikomba market trade thrives on variety and pricing. It is a "cheap" market where goods are sold more cheaply than in most parts of Nairobi and the country at large. Although most of the trade takes place in the open air, there are market stalls that were built by the City Council.

The Gikomba traders are millionaires "in spite of the muck" in which they operate. The first indication that there is big business in Gikomba is the presence of main commercial bank branches in the vicinity. The second hand clothes wholesale traders can make up to about Kshs 500,000 a day. An importer was robbed of Kshs 800,000 by gangsters in June 2008. When a fire broke out in 2009 in Gikomba market, Mr Karanja, one of the traders, estimated his loss at over 1 million Kenya shillings. Frequent fire breakouts is common in Gikomba market and trader losses run into millions

(Jamah Ally, 2010). It is estimated that the City Council of Nairobi collects about 7 million Kenya shillings per month from the market, making it the richest market in Nairobi. The council targets Kshs 280,000 from market cess from the traders per week (Waweru, 2009).

Figure 2- 2: News of fire in Gikomba, 2009

Fire Guts Gikomba Market

A fire broke out at Nairobi's Gikomba market in the early hours of Thursday destroying property worth thousands of shillings. Mr Stephen Karanja, who owned a timber shed, was counting losses running up to Sh 1 million. His predicament was particularly unlucky as he had only just stocked his shed when tragedy struck. "I had brought in two lorries full of timber all the way from Muranga on Tuesday," said a distraught Karanja. He put the cost at Sh 700,000. "I don't even know where to begin," he added as he stared at the charred remains of the shed he has run for over 16 years.

Bornice Biomndo, in Nation on-line, January 15, 2009

Source: Biomndo, The Daily Nation newspaper, 2009

The growth of Gikomba market is further exhibited by the expansion of banking services. Most of the large commercial banks such as Barclays Bank, Cooperative Bank and Equity Bank have started branches within Gikomba market in the last four years.

Unconfirmed report from the Forest Service in Nairobi (Lati, 2008), state that an estimated trees worth Kshs 100 million were felled illegally between December 2007 and 2008 in Kenya. The Government has put strict penalties on persons found illegally felling trees and transporting wood. Lack of wood has been attributed to the political violence erupted after the 2007 parliamentary elections, over felling of trees for firewood and paper products. Webuye Paper Mills in Western Kenya remains closed by the government due to its reliance on wood. The impact of depleting wood has led to a rise in prices. A finished five-seater sofa was Kshs 18,000 and within three months it rose to Kshs 25,000 in 2008 (Lati, 2008).

2.3 *Administrative and Institutional Structures*

Gikomba market lies between four constituencies and has a District Officer and Chief overseeing administrative activities. There is a District Officer who oversees the administrative aspects on behalf of the government. There is a Chief who helps in maintenance of law and order. The City Council is the other arm of Government that operates in Gikomba market. The Council collects revenue of Kshs 600 per week from 33 selected enterprises that totals to Kshs 79,200 per month. They do not provide any services to the entrepreneurs but the entrepreneurs pay because they fear harassment.

The other institutions operating in Gikomba market mainly provide financial services. This is in the form of micro credit through the welfare and informal associations. The main Commercial Banks such as Cooperative Bank and Equity Bank also have branches in Gikomba market. In the last five years there has been an increase in the presence of the commercial banks and this is a sign that economic activities in Gikomba market are financially viable.

2.4 *MSE Societies and Associations*

Reference is made to The Kenya National Federation of Jua Kali Associations (KNFJKA) as a key partner in the 4K initiative in the implementation of Vision 2030. This presupposes that there are grassroots associations that are strong and are affiliated to KNFJK. The KNFJK communicates with the Jua kali through word-of-mouth, although such information was found to be irrelevant and not important to the enterprises; not reaching them on time or completely unavailable. There was a magazine of the Federation titled "Mwamko" that folded up in 1997(ITDG 2007). In Gikomba, there are several informal and formal welfare associations that are operational. Some of them were registered with the Ministry of State for National Heritage and Culture (former Ministry of Culture). These associations include the Gikomba Jua Kali Association, Ufundi Cooperative Society, Baba Ndogo Carpenters Association and Small Dandora Association (see Appendix III). At its peak, Gikomba Jua Kali Association had up to 75 members. Presently however, the association is not very strong due to defaulting of members in payments.

The employment of associations as intermediaries in providing training in Kenya can be traced back to the World Bank voucher program. The project estimated at US\$ 21.83 million over a six year period (1994-95 and 2000/01) targeted 60,000 entrepreneurs and workers in already established Jua Kali enterprises. It aimed to build on traditional forms of apprenticeship and other forms of enterprise-based training in the informal sector with reduced government involvement. The associations were expected to be responsible for distribution of vouchers to their members and identifying and managing the training. The success of the voucher programme has not been established because of little information on the outputs, conflicts within and between the Jua Kali associations along with institutional weaknesses (www.evancarmichael.com).

The then Ministry of Research, Technical Training and Applied Technology (MRTTAT) encouraged mobilization of the Jua Kali and arranged exchange programmes as a means of technology transfer, (Abuodha and King, 1991). They quote one visit of Rumuruti Jua Kali self help group (Nyeri) in mid 1989 to Gikomba market that was seen to be more technologically advanced. The visitors gave feedback of how they learnt to accelerate and enhance output through the use of machinery and they saw how quality wood products were produced using machinery that they acknowledged was expensive but worthwhile investing in. These initiatives show that there is opportunity for informal technical skill transfer through associations. However, it was noted that unlike the artisan trade in West Africa, the Kenyan informal sector does not seem to have a strong voice in the form of associations (Abuodha and King, 1991).

2.5 Manufacturing and Engineering Activities

Gikomba market has variously been referred to as the “centre of innovation and technology” or “an intense business district” (Abuodha and King, 1991) because of its industrial activities. In the early 1990s there were one or two Asian engineering workshops, although the bulk was dominated by African artisans (Abuodha and King, 1991). The technology levels are varied ranging from complex engineering production to what can be described as low with operations concentrated on forging, sheet metal and tube working and general bench fitting activities. The capital employed in the lower end are basically hand tools such as hammers, tongs, chisel, punches or hacksaws. The quality of products from the MSEs is varied. However, a close observation of the successful products shows that there is always an external force driving the product development. For

example the tin products shown in Figure 2-3 and the improved *Jiko* (charcoal stove in Appendix VII c). Tin products include hand washing pans, floor cleaning pans, chicken feeders and mops and brooms, milk cans, wheelbarrows and ploughs; metal boxes for school children and restaurant equipment such as deep fryers. Tin products shown are made from scrap tins most of the time, which are cleaned, recycled, cut, shaped and soldered.

Figure 2- 3: A common energy saving *jiko*



Source: Maleche, 2007

The design and development of these products such as the *jiko*, depends heavily on research that was sponsored by USAID. At the time, the agency was concerned about the inefficient use of wood and charcoal for cooking using traditional stoves. The research led to the development of the improved *jiko* with consideration for shape, raw materials, energy efficiency and environmental sustainability. Follow up and dissemination of new technology is undertaken through training by selected professionals (Maleche, 2007). This process has managed to keep good standards for quality *jiko* production (see Appendix VII for production detail).

Abuodha and King (1991) noted that the metalwork is highly diversified both in premises and products within MSEs. An insight into the broad range can be seen in Figure 2-4 that shows finished products displayed and spilling out of the premises. Appendix VII outlines the design and manufacturing of some of these products.

Figure 2- 4: Jua Kali metal box production



Source: Myweku, <http://timbuktu-chronicles.blogspot.com> (Retrieved on 8th December 2010)

The tin smiths have been in Gikomba market for a long time and they provide products to distant places in the region, for example, traders from Lodwar make large orders for metallic milk cans. Most of their raw materials are sourced from Industrial area. Sheet metal, depending on the gauge (between 18 and 24) ranges in price from Kshs 100 to Kshs 500 for 1 kg (as at 2011 the exchange rate was US\$1 equivalent to Kshs 80). The price variation depends on the thickness of the metal and the source or place of origin.

Figure 2- 5: Popular household tin products from Gikomba market.



Source: Field data, 2010.

The manufacturing is done by cutting the metal with special scissors and turning it to make joints. The process of cutting and joinery requires specialized skills because, if not precisely done, the final product will be faulty. The artisans are sourced from rural areas and are trained for six months before they start earning salary.

Gikomba engineers manufacture machinery such as flour mills, fodder cutters, coffee grading machines and weighing scales. Steel windows and steel doors are also made in Gikomba market. The first Raehe Machine was developed by a Muranga based artist called Mugweri in 1980. Since

then machines such as automatic grinders, blade sharpeners, lathes and cutters are produced there. Spare parts for vehicles such as wheel rims are also produced in Gikomba market.

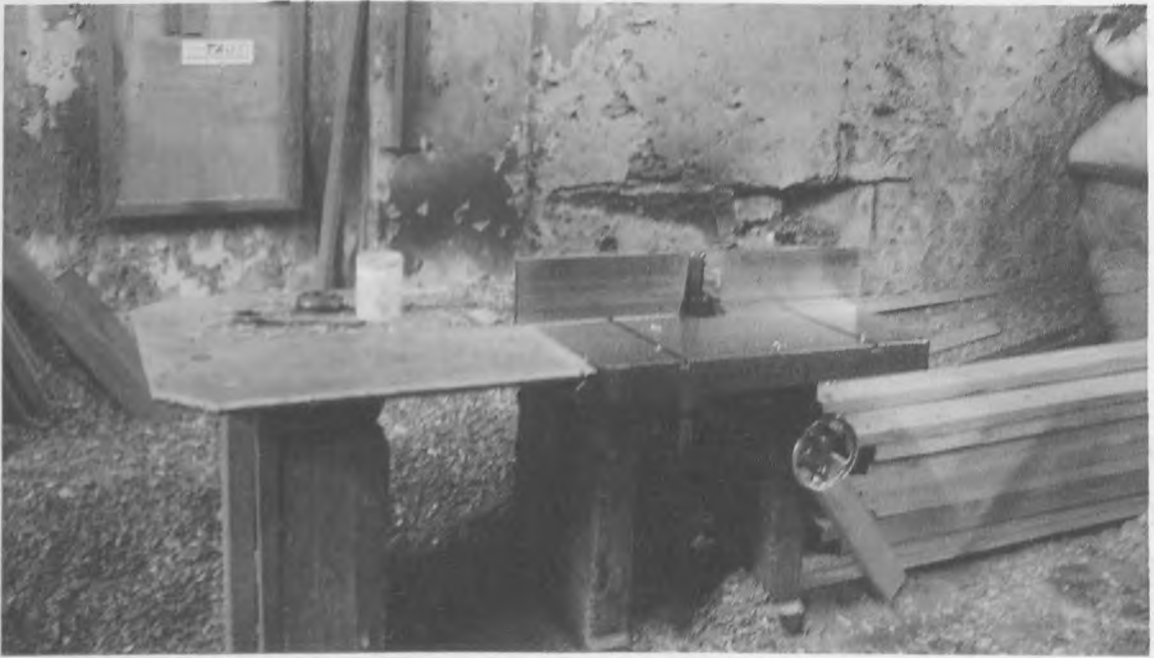
Figure 2- 6: Push bench machine fabricated by Gikomba engineers.



Source: Field data, 2010.

Sofa makers purchase most of their equipment from the engineers in Gikomba market. These machines can cost three times less than the cost of imported machines, yet the Gikomba ones work better. A typical engineering enterprise is equipped with electric grinders, welding and assembling, metal cutters, chisel, hammers, cutting shears, electric drills and acetylene gas welding sets. A few enterprises have hydraulic presses and screw cutting centre lathes.

Figure 2- 7: Dimension saw fabricated by Gikomba engineers.



Source: Field data, 2010.

In terms of metal work therefore it can be seen that Gikomba entrepreneurs have developed in diversity of products and in development of specialized machinery for production.

Figure 2-8: Artisans using the Dimension saw to cut wood.



Source: Field data, 2010.

In woodwork also there has been considerable development through the use of the equipment and machinery fabricated within the market. In the 1990s, Abuodha and King (1991) it was noted that they were mainly using hand tools, a clamp and bench, slowly progressing to automated lathes and other bench and hand saws. The researchers commented that this machinery, although basic, improved the design and quality of furniture.

2.6 *Summary*

Gikomba market is a centre for the exchange of goods and services. It is centrally located with easy access to public service vehicles for upcountry at Machakos Bus Stop and within Nairobi city. The market supplies goods and services to most households in the city. This includes fresh vegetables, fish and meat products, textiles and fabric, engineering and furniture products. Gikomba market continues to expand and there are increased economic activities as seen by the presence of the big commercial banks there. Most traders in Gikomba market have turnovers of thousands of shillings per day.

The furniture businesses are concentrated along Kombo Munyiri Street where you will find photographers, brokers, upholsterers and ornament makers on the street. The street is lined with fabric shops, hardware stores and wood stock shops. Many people are drawn into Gikomba market because the goods are perceived to be cheaper than other markets. The few heavy duty machines dot the busy hub. The machines used by the frame makers are all designed and developed in Gikomba market by the engineers whose workshops are not too far away from the furniture shops. Sofa customers are varied but the focus of the research was on the individuals who walk into Gikomba to purchase a sofa set. These customers have constrained living spaces; they have limited financial resources and therefore appreciate a lower price or bargain.

3.0 DESIGN THEORY AND RESEARCH

3.1 *Overview*

This chapter examines some principles and methods that have been employed to develop design theory. It discusses the nature of design inquiry and how the methods and processes of inquiry relate to other social and scientific methods of research. The science of design is evolving around knowledge derived from practice, products and processes. Design practice and knowledge is interdependent and multi disciplinary with for example, engineering, social sciences, business management and cultural artifacts. This unique multiplicity has given rise to theories like that of the "wicked problems of design," social design and sustainable design theory. Design theory has evolved over the years in response to global phenomena, design needs and changing lifestyles.

Design research from which the theory is developed takes several forms mainly experimental, the more known form of design research that results in products and services, and generative, the more philosophical and theoretical that generates knowledge (like this research). The two streams of design research are discussed drawing from the work by local and international designers. Methodologies for conducting design research are presented and methods of analysis. The chapter proceeds to examine some of the benchmarks that relate to investigating furniture, particularly sofa design and production.

3.2 *Design theory and theoretical framework*

Design theory is derived from problem definition or problem solution (Buchanan, 1995). *Problem definition* is "an analytical sequence in which the designer determines all of the elements of the problem and specifies all the requirements that a successful design solution must have." *Problem solution* is "a synthetic sequence in which the various requirements are combined and balanced against each other, yielding a final plan to be carried into production." If this approach was applicable, then design solutions or outputs would most probably be predictable as in the pure scientific experiment. And Rittel (1972) disproves this linear design thinking by stating that "the actual sequence of design thinking and decision making is not a simple linear process and

secondly, the problems addressed by designers do not, in actual practice, yield to any linear analysis and synthesis yet proposed. In answer to what then designers do Buchanan (1995) states that designers "conceive their subject matter at two levels, general and particular." At the general level, designers form an idea or working hypothesis, outlining the "ideal" or artificial in relation to the natural. When taken to task, they are able to explain what the subject matter of design is. These explanations are philosophies or proto-philosophies. But, these philosophies do not and cannot constitute science of design in the sense of any natural, social or humanistic science. The reason given is that *design is fundamentally concerned with the particular, and there is no science of the particular*. Design thinking and the activity of production or making, need to be critically analyzed in order to begin to understand design philosophy. The analysis of a product, conception, production, may be studied as arts or sciences - history, economics, psychology, sociology or anthropology. In all this study, activities of design thinking are confined to the kind of product and the product attributes. However, the problem for designers is to conceive and plan what does not yet exist and this gives rise to design as "the art of the artificial" and ultimately supports the "wicked problems" theory of design. Each of the sciences that have come into contact with design has tended to regard design as an "applied" version of its own knowledge, methods and principles. As a result, design is variously regarded as "applied" natural science, "applied" social science, or "applied" fine art (Buchanan 1995).

There are two branches of design theory, that of the product and that of the process. Designers are able to operate between the two with ability to follow design process in order to develop new innovative products and services and be able to explain the process and consideration for design philosophy. This research followed the process path, investigating the process that is followed in the realization of the sofa. But, the focus in the process was not the product but rather the "designer" who makes it happen who in this case is the sofa-designer entrepreneur. The underlying belief is that the outcome of design is dependent on the knowledge and skills of the designer or maker. Following a process without taking into consideration the maker's abilities cannot guarantee successful products.

3.3 Design Research

Design theory is derived from research into design and because of the nature of design, design research is sometimes referred to as design methodology, science of design or design science. It has a history that can be traced to 1966 initiated by the Design Research Society. It started with general theories about design (based upon operations research and management decision-making techniques). The theories are drawn from society members including Cross (2008, 2007, 2002, 1999) and Moggridge (2008) who champion the cause in articulating the science of design research. The theories have evolved from addressing individual design disciplines to more universal cross disciplinary theories. Design research focuses on the development, articulation and communication of design knowledge that is found in people, processes and products. The articulation of design research was motivated by the view that design and architecture research was to some extent *flawed*. For this reason, these theorists sought to streamline design along scientific tradition on which research leaned. Today, design researchers strive to embody an intellectual culture of '*designerly*' research that embodies '*things to know, ways of knowing them and ways of finding out about them,*' (Glanville, 1999, Cross 1999). Design research is both interdisciplinary and disciplined (characteristic of scientific research). Cross (1999) and like-minded design theorists propose that scientific research itself is a branch of design and not vice versa (that design research is a branch of scientific research).

Design methodology (including the study of how designers work and think) is the scientific study of methods that are or can be applied to designing. It is strictly a sub-field of the philosophy of design. Science of design refers to that body of work which attempts to improve our understanding of design through "*scientific*" (*i.e systematic, reliable*) methods of investigation (Cross 1993). Design science refers to an explicitly organized, rational, and wholly systematic approach to design, not just the utilization of scientific knowledge of artifacts, but design in some sense as a scientific activity itself.

There are two categories of design research, the first addresses research on the process of designing and the second one, identified as "generative design research" (Moggridge, 2008). The two categories are shown in Table 3-1 in which the design *process* is one type while the other is "*generative.*" In both cases, design research is mostly undertaken by designers, on design. Normative general studies generate information on people, their values, beliefs and preferences

within a given society. This information once collected is used to develop normative theory that can in turn inform concepts for products.

Table 3- 1: The two categories of design research.

No.	Experimental Research (as part of design process)	Generative Research (research about design)
1.	Develops methods, strategies and models.	Develops design theories and philosophies.
2.	Prescriptive <i>Can involve development of models.</i>	Descriptive <i>Models can also be developed from descriptive design research.</i>
3.	May involve multi disciplinary thinking as well as specialist design practitioners.	Biased to knowing about how to know.
4.	Mostly undertaken by design practitioners. Conducting rigorous and reflective inquiry to test and refine innovative products or systems.	Can be undertaken by Design scientists who are not necessarily practitioners in design.
5.	Experimentation can involve prototypes, visualizations, video projections, animated storyboards (animatic), or sequenced images and pictures.	Research instruments involve visualizations and ethnographic documentation.
6.	Research results include new products, systems or models.	Results are patterns, challenges and opportunities developed from understanding people's emotions, perceptions and motivations.
7.	Innovative products/systems/models.	Interpretations that inspire new perspectives that goes against the "conventional" ways of seeing things.

Source: Developed from Moggridge (2008), Dorst (2006), Brown *et al* (2003), Cross (2002)

Much of what we know as design research has been developed from experiments in which designers present their process and exhibit products or services. It also has a strong relationship with engineering processes. Generative design research leans heavily on scientific research of biological nature and also, relates strongly with other disciplines of social and behavioral sciences. Global trends show accelerated growth in this area focusing on quality lifestyles away from increasing products into the environment. This research contributes information understanding and debate on this expanded scope of design knowledge. It develops grounded theory on design processes, employing qualitative methods borrowed from both design research and social research methodologies.

Outputs from Generative Design Research

The outputs from experimental design research can be a model, prototype or system. The outputs from generative design research on the other hand are design philosophies, theories, methods, strategies, and models. Models can be descriptive as well as prescriptive. Some important strategic choices that design researchers have to define include *exploratory research* or *research in depth*; *empirical research* (based on observation) or *theoretical research* (based on reflection); *qualitative research* or *quantitative research*; *general or specific* and *concrete or abstract* research (Reymen, 2001). A definition for each of these kinds of results is extracted from Cross (1999) and given below.

- A *design philosophy* is a school of thought expressed by designers and researchers as regards how design is, might be, or should be done.
- A *design theory* is a collection of concepts, principles, and experientially verified relationships useful for explaining the design process and providing a foundation for the basic understanding required for proposing useful methods. In products, design theory deals with desirable properties that new products should have, such as, usability, beauty, symbolic meaning, ecology, economy and safety. The starting point for this theory is the descriptive theory of the same topic such as aesthetics and semiotics.
- A *design method* is a set of guidelines that can be followed during the design process in order to arrive at a realizable product. A design method is any procedure, technique, aid, or tool for designing. Design methods represent a number of distinct kinds of activities that the designer might use and combine into an overall design process.
- A *design strategy* describes the general plan of action for a design project and the sequence of particular activities (i.e., the tactics, or design methods) which the designer or design team expects to take to carry through the plan (Cross, 1994). To have a strategy is to be aware of where you are going and how you intend to get there (Cross, 1994).

- A *design model* is a representation of a philosophy or strategy proposed to show how design is and may be done.

This research belongs to the second category developing theory from descriptive information gathered from design as practiced by the micro and small enterprise sector in Kenya. The outcome can influence the practice and education of design in Kenya.

The design research stated above, especially the first category that deals with research as part of the design process, is typically undertaken by a design specialist who has a clear understanding of the expected outputs from the research and is able to stop the experiments once that has been achieved. This research falls in the second category and in this case, the design specialist is a non participant observer and does not interfere with the design process.

3.4 Relationship between Design and Social Research

Design research has close interaction with scientific and social research. Social research methods that were found relevant were normative and ethnographic. These are compared with experimental research that has a more scientific orientation in Table 3-2. Normative research is concentrated on the present and the future and not in the past. It focuses on the problems that people have today, and the ideas that they have about the future, posing questions such as: why are we creating products? What kind of product do we need? Do I like present products? Does it give anything to me? What could be better? Research into artifacts and products has also been undertaken employing normative theory. The approach to normative research approach involves developing models, standards and algorithms that are expected to achieve desired properties in a product, such as usability, economy or safety. Typically, as in a work of art, there are no fast rules, for paintings and even products, in which case, normative theory operates mostly with exemplars (i.e important earlier works of art, as commented from contemporary point of view by experts). This is the significance of normative theory in this research. The fact that the MSEs do not appear to fit into the design hierarchy of skill and knowledge, means that in order to benchmark their design knowledge, we need to develop exemplars or "ideal" MSE design practice and determine how far removed the present practice is.

Table 3- 2: Relationship between experimental, design and ethnographic research

No.	Experimental Research	Design Research (Experiments)	Social (Ethnographic) Research
1.	Laboratory setting	“Wicked” problems. Subjective interpretation. Requiring researcher (designer) to determine the direction of the experiment.	Not objective
2.	Single dependent variable	Multiple dependent variables affected by the researcher’s perspectives, identity, background and experience.	Multiple variables affected by backgrounds, biographies, and identities.
3.	Controlling variables	Characterizing the situation	Variables may not be articulated.
4.	Fixed procedures	Flexible design revision	Procedures are not fixed.
5.	Social isolation	Social interaction	Social interaction typical to the community under study.
6.	Testing hypothesis	Developing a profile	Developing a profile and NOT replicable. Not based on large number of cases.
7.	Experimenter	Co-participant in design and analysis.	The researcher interprets the research within stated “relativism”.

Source: Developed from Silverman, 2005, Collins *et al*, 2004, Cross, 2002).

To do this, this research posted several sofa seats that have been developed by “professional” designers, identifying their qualities and considerations. From these variables were identified and features for appreciating the MSE sofa design practice was formulated. Ethnographies are typical social research and are based on observational work in particular settings. The initial thrust in favour of ethnography was anthropological. Anthropologists argue that, if one is really to understand a group of people; one must engage in extended period of observation (Silverman, 2005, Judd *et al*, 1991). It does not attempt to analyze the effects of any intervention. In many cases, independent variables are manipulated to ascertain their effects on dependent variables. Design experiments however, go beyond the assertion of relationships between variables as seen in Table 3.2 that is a summary of a typical situation of experimental (scientific) research, a typical experimental (design) research and ethnographic which is social research. This type of design research results in the development of products, services or systems. This research however, is

philosophical and results in the development of theory on the MSE design practice. It was however not possible to develop the theory without the understanding of the products and processes by observing the activities.

3.5 *Design Principles*

Design principles are important to the practice of design because products such as the sofa can have many variations and most of these variations will depend upon the design principle that is being considered. Design theory can be developed from principles of design. Design principles can be described as ideologies that guide the development of products and services, for example, the Swahili culture that has guided the works of craftsmen such as Skanda (Mudi, 2010) can be investigated and formulated into a design theory. The application of principles during the design process leads to a design method and the method in turn can be developed into theory. A design method will typically involve the application of principles to procedures, techniques, aids, or tools for designing artifacts or systems. Principles of Social design, Eco design and Sustainable design are applied by designers seeking to reflect upon and develop design that is sensitive to human and environmental needs of the world. These are some of the theories that design researchers continue to investigate. Research into these principles and their ability to hold as theory continues and this research contributes to this body of knowledge. The knowledge of design or the “designerly” ways of knowing (Cross, 2008) has issues occasioned by the nature of design. Design methods including Hybrid Product Design Method are discussed in Chapter 4 of this thesis. A principle such as User Centered Design can be applied to any method or design process for specific purpose. Design theory is built around multi disciplinary knowledge; it borrows from more established methodologies but, because of its unique orientation, employs them in different ways. For example, design of consumer products (industrial design) and design of the built environments (architecture), in which beyond functionality, the emotion and poetry of the designs need to be put into consideration. Emotion, poetry and ambience are the language of design describing the artificial nature of design (Maier, 2008). This tacit nature of design challenges design researchers’ attempts to make it explicit. This research is an effort in this endeavour.

3.5.1 Social design

Social design is closely associated with User-centered design (also referred to as human-centred design) process. In 2009, definitions of social design and its implementation in solving design problems were just emerging. In newsletters and debate, a definition was given by Victor Margolin as "Design aimed specifically at improving the quality of life. It is accountable to social results and not simply successful market exchange" (*Social design/debate/1 newsletter*).

According to Josephine Green:

"Design on its own is too broad and can be too easily co-opted by the old. Industrial Design reflects the past not the future. By putting social before design, things change, things open up. Social Design offers vistas of social change and transformation and emphasizes its relevancy and meaningfulness for the 21st century. Put simply, a broader meaning to social innovation/sustainability equals and is complemented by the broader meaning of social design. A design for the next era" (*Social design/debate/2 newsletter*).

In the opinion of Ezio Manzini:

"One of them is a design with an explicit social agenda: a new design field where some designers specialize in collaborating with social workers to solve specific, acute social problems. The other one is more general and refers to the whole design community. In the latter, all designers, whatever their specialization happens to be, must redefine their aims and re-orient them towards new emerging social demands. Though both these actions are important, for me, the biggest challenge today involves the latter definition of design: to develop knowledge that is needed to improve the welfare of the whole society, as we move towards sustainability" (*Social design/debate/3 newsletter*), (Peruccio, 2009).

3.5.2 User centred design

User centred design (UCD) is an approach to design that grounds the process in information about the people who will use the product. The central premise of user-centered design is that the best designed products and services result from understanding the needs of the people who will use them. User-centered Design methodologies are regulated by international standards (ISO 13407:

Human-centered design process) that defines a general process throughout the design development cycle. Outputs and products from user-centered design (UCD) are easier to understand and use and improve the quality of life of users by reducing stress and improving satisfaction (User-ability Professional Association, 2009).

User observation is based upon ethnographic methods in which the designer immerses him or herself in the users' context (for example, spending time with users as they go about relevant tasks at work or home. The dynamics of their interaction with products can be appreciated through observation. In the context of this research, the interaction of the sofa in relation to other furniture; the users and the general ambiance of spaces would be important to designers who ascribe to user centered design process.

The example from designer Arik Levy, an internationally renowned sofa designer who is based in France responds to the specific needs of user's who have constrained living spaces. The Arik sofa is famed for certain features that include:

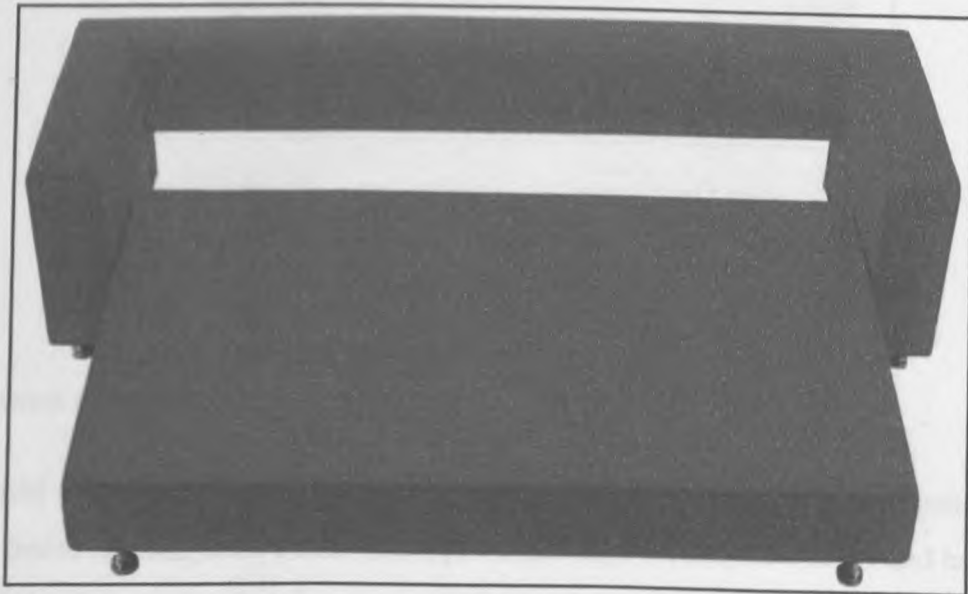
- a) Quality (that the designer can prove and is proud of),
- b) Adheres to European standards in dimensions;
- c) Specializes in one multi functional style (sofa beds);
- d) Customers are free to inspect the materials and production during the process;
- e) The design and production is undertaken under one roof under the supervision of the designer.

Levy (2002) designs sofas for individuals who *have less space* in their living rooms and *who need sofa beds* (Figure 3-1). He has a philosophy that in designing sofas, designers should "*look for solutions that adapt to the user rather than having the user adapting to the product.*" Levy's success as a sofa designer is anchored on a good knowledge of customer needs. This necessarily means that a good knowledge of the customers informs the sofa design style.

In the context of this research therefore, inferences can be made that the MSEs serve customers who share the needs with Levy's customers in that they live in constricted spaces, often using the sofa as a bed. This was echoed in a recent article that identified the Japanese Futons (Njeri, 2010) as exactly

what Kenyans need, given the constricted living spaces. Futons are a traditional Japanese piece of furniture that is “lovely, flexible and adoptable” (Njeri, 2010 see Appendix X).

Figure 3- 1: Arik sofa designed by Arik Levy. 2002



Source: Metropolis Magazine, 2002

Professional designers are able to produce acceptable sofas that answer to specific customers' needs. The artistic sofa in Figure 3-2 is one approach to sofa design in which the designers is responding to individual taste and expression.

The Freeform sofa because of its shape and size cannot be universally used. It requires a little more attention to where it will be used, who will use it and how it fits with the rest of the living space. This type of sofa is covered with delicate fabric that cannot be exposed to dust and heavy users. However, it will answer to the needs of a sophisticated, high end, spacious environment clientele. It requires specialized training to be able to design and produce this sofa.

Figure 3- 2: Freeform sofa designed for individual taste



Source: Sourcebook of Modern Furniture, 2002

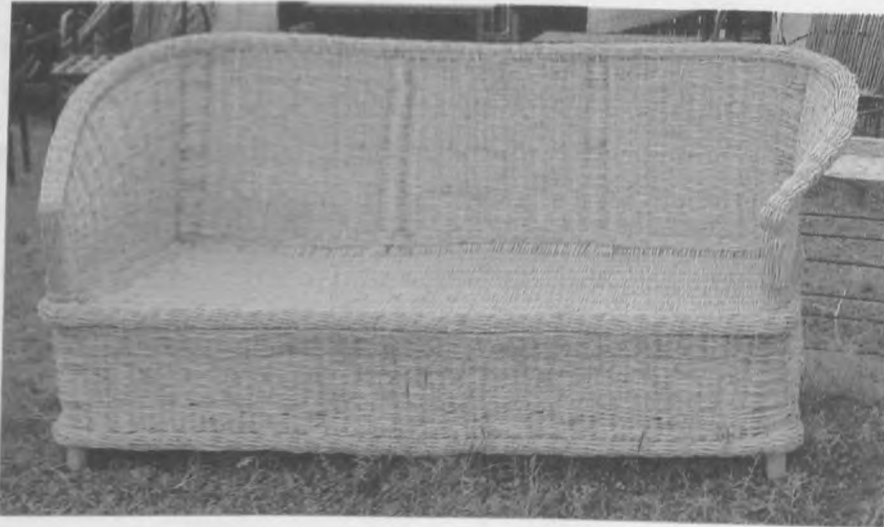
Isamu Noguchi (1946) who designed the Freeform sofa in Figure 3-2 considered sustainability and comfort. The frame is made from beech wood padded with Polyurethane foam and is covered with removable fabric. This means that the user can change the seat covers as often as he or she prefers, thus expressing the sofas flexibility.

3.5.3 Eco-design

Eco design or ecological design seek balances or converge toward some equilibrium, at which point populations keep each other in check, maintain varieties of species, and ensure efficient use of limited resources (Krippendorff, 1995). It is defined "any form of design that minimizes environmentally destructive impacts by integrating itself with living processes" by Sim Van der Ryn and Stuart Cowen (www.wikipedia.org). Ecological design places ecology at the centre of design and provides specific ways of minimizing energy and material use, reducing pollution, preserving habitat, and fostering community, health and beauty. It provides "a new way of thinking about design." In the area of furniture, eco designers develop furniture that after life do not remit green house gases. Traditional sofa that is shown in Figure 3-3 is still popular in many parts of Africa. They can be seen displayed by the roadside in cities such as Nairobi, Kampala, Arusha and Maputo. The sofas are warm, hand crafted, use readily available raw materials and can be accessorized with cushions to fit any household. The sofas are structurally stable, sometimes

metal frames are used instead of wood thus giving them a very long life that is accentuated by re-upholstering. This fact of creating a long life sofa is doing a good deed for our world and for its future generation.

Figure 3- 3: Eco-friendly sofa made from wood and sea grass



Source: Osanjo, 2010

3.5.4 Sustainable design

Eco design shares the concept of responsible production with the proponents of sustainable design. Whereas, the emphasis for eco design is on environmental considerations, sustainable design goes further to include the labour and production processes that the product goes through. The term sustainability is broad, but in the context of furniture such as sofa, sustainable implies social responsibility, use of non-polluting technologies and certified materials, employment fairness and more. Though these "*manufacturing with a conscience*" (Sustainable environmentally responsible furniture, www.comfy.com) ideals cannot be argued with, often they are difficult to implement on a regular basis. To encompass these practices we need to be responsible for the production cycle from raw material acquisition through to manufacture, end use and final disposal.

Designers who design eco-friendly or sustainable sofa, invest in longer lasting sofas that do not require replacement or re-upholster till after 15 to 20 years. Eco - friendly sofa design process places sustainability at the centre of their design activity as seen in Figure 3-4 where:

- a. Attention is paid to structural development
- b. Customer is assured of "purchasing durable, long-lasting goods."
- c. Reducing waste before it becomes a problem
- d. Recycling is rarely done on sofa and so durability is emphasized
- e. Attention is paid to size, glue (water based), wood types, cushioning and upholstery
- f. Can fit "living spaces that are small,"
- g. The adhesive used is "low in emissions,"
- h. The "basic wood is oak that is plentiful,"
- i. Use of natural fibres
- j. Avoid waste of non-renewable resource.

Successful implementation of sustainability in sofa design involves knowledge of ergonomic analysis, competitive product analysis, ethnography, lifestyle research and product anthropology. Furniture designs generated from this understanding, "closely match the needs and desires of the target market" (Dodd, 2001). This is because they are designed with the end user needs in mind and also design considerations.

It should be noted that sustainability is not necessarily cheap, because consideration of environmental factors can result in higher prices of raw materials. It is for this reason that sustainable sofa is not about an alternative material, but rather, "longer life" of the materials. From the above examples it can be seen that both the experienced and trained designers consider customer space needs, quality, standards in dimension, and specialization by style, durability, low carbon emission, use of natural fibre production supervision in the design of sofa. Sustainable design supports ecological, efficient and environmental sensitivity and presupposes that designers strive to preserve the environment for the future generations.

Figure 3- 4: Sustainable sofa



Source: www.comfy1.com/green-furniture.htm. Retrieved on 23rd November 2009.

The question therefore that each designer asks before embarking on design activity include: Is there a need for a new product? What is the impact of the product on the environment and users? How will the product be disposed of after use (Vil-Nkomo and Viljoen 2006)? It can be seen that various design principles can be applied that will give various outputs. The choice of principle depends on the priority and concern for the customer or environment or sustainability or a combination of any of the above. It is in this context that this research sought to establish which of these principles was driving the sofa design and manufacture within the MSE sector.

3.5.5 Design by Non-designers

In the introduction to this thesis, the problem is defined as a lack of design in the MSE sofa production. Later in this chapter, there is an argument that not everybody who makes an appropriate design decision is a "designer." This brings to the fore the issue of individuals who design but have no design training - "non-designers." Design by non designers is used to refer to design that happens outside the "trained" designers' activities. Design by non designers refers to substantial design activity that goes on outside the designers' field as articulated by Yong Qun Chen (2008) who explored the "informal design practice" in Shanghai. Chen (2008) defined informal

design practice as "Non-designed design," or unprofessional and non-productive design. But he acknowledges that its spirit and practice is very much closer to the spirit and truth of the genuine meaning of design. Design is seen here as a motive force for changing human society and as change agent. The practitioners are not conscious of design and live and work at the "bottom of the urban pyramid." Non-designed design practice is a unique creation, a process of consciously learning, introducing and reinventing the subliminal invention; it is unconventional and distinguished from "good" professional and productive design as can be seen in the chairs in Figure 3-5. The significance of Non-designed design is that it is a driving force that is pushing us to change our conception and perception on design. It is therefore re-aligning the meaning of design. Non-designed design makes a mockery of our formal design (professional design) and the role it has played in society. Chen (2008) faults formal design for being insensitive to the meaning and value of life; or the genuine meaning of design practices to human beings; and the creation of objects and new forms that are dangerous to human development. Chen (2008) anchors non-design design on three principles, that is; it is for the masses; it is ecological and is guided by a healthy life condition for both spiritual and material to humans.

In Figure 3-5, residents of Shanghai create chairs by piecing together two broken parts of different chairs. The chairs are functional because one can comfortably sit on them; they also reduce waste by recycling used chairs. It can also be said that these chairs are cheaper than purchasing new ones. The lesson here is that failure by designers to recycle or make functional products out of available material, is leading to the emergence of the "people's design" or as Chen (2008) puts it, "non-designers design." When designers do not respond to human needs, it gives rise to non-designers to produce products such as the Shanghai chairs. These non designers if left to flourish will continue to produce such products for the masses. Products that can be said to "function," but that lack design. Design has been defined as a process with pre determined expected outputs or intent. From observation, it can be said that these chairs are a result of piecing together materials from various broken pieces of furniture. They can be said to be "recycled" although lacking critical design considerations that would make them aesthetic and "pleasurable." From the description above, it can be said that the MSE entrepreneurs may belong to this cluster of "non designers" in so far as they do not seem to apply design principles, or if they do, maybe not consciously or not enough. This issue is discussed in later chapters that examine the MSE skill acquisition and design knowledge.

Figure 3- 5: Non designers' chairs in Shanghai



Source: Yong Qun Chen (2008)

This section has identified some design principles that sofa designers apply while undertaking sofa design. This includes application of design principles of for example, user centered design to design methods to produce sofa for individuals with limited spaces and who need sofa beds. Away from professional designers, there is a group who provides more products including chairs to the middle and lower income of the population, the non-designers. The issue of concern therefore is whether MSEs are non-designers or they form another category, if they are not "designers."

3.6 *Design knowledge and training*

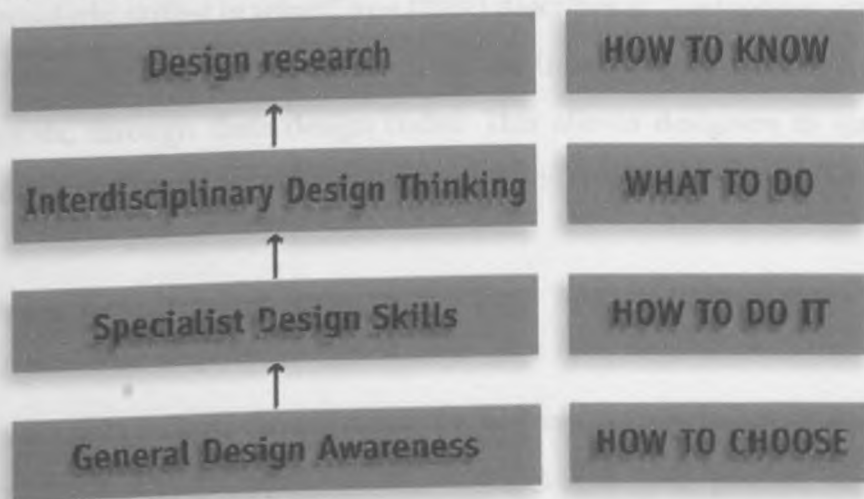
The study of design involves an understanding of both tacit and codified knowledge by nature. Tacit knowledge is knowledge that typically cannot be articulated, while explicit knowledge is knowledge that has been articulated and captured in formal and systematic manner, implicit

knowledge is knowledge that can be articulated but has not yet been articulated (often requires an expert such as an engineer or designer), (Nickols, 2000). Tacit knowledge is embedded in the creativity and intuition that designers employ in the creating form from abstract ideas. Codification domesticates this tacit knowledge thus making it explicit. The significance of this is that codification is the translation of pictorial expressions (images) into symbolic content making it possible to arrange and critique the knowledge. Codification is described as "a spatial device to screen and classify information, opening opportunities for the modeling or representation of knowledge, a knowledge production and accumulation," (Foray and Steinmueller, 2010). The difference between experienced designers and trained designers could also be in the realms of explicit and tacit knowledge. All designers to some extent use tacit knowledge during the design process whether consciously or unconsciously (Hoffmann, 2009, Cross, 2007). The knowledge acquisition happens even without conscious effort. In the situation of small scale furniture making the relationship between tacit and explicit knowledge is important as "one learns procedurally by imitating the observed behavior of one or more masters, and trying it out in practice. The individual firm is a learning organization built on the workers formal and informal learning" (Beerepoot 2008). The design process is shaped by new experiences and interactions as well as how we respond to them. Design studies is emerging as a combined effort of people including designers, design historians, and scholars in a variety of existing disciplines reflecting on the nature of design and the human-made products created through deliberate planning (Buchanan 1995 b). The central theme of design is the conception and planning of the artificial. Design provides the thought which guides the making of all products, whether by individual craftsmen or mass production techniques: (1) material objects, (2) verbal and visual communications, (3) organized activities and services, and (4) complex systems or environments for living, playing working, and learning (Buchanan 1995 b). Design study is reflective and seeks to make explicit the diverse assumptions that guide design and to examine their consequences on the past, present, and future.

Design study is directly related to the making of products. Making has two components: the actual work of fabrication and secondly, the ability to explain. Those who fabricate often through repetition and direction of others, but are unable to explain are technicians who practice a trade. Designers who reach a position of authority among their colleagues and clients are those who are able to explain the basis of their work of designing in a manner that is pragmatically meaningful (Buchanan 1995 b).

Design is a universal means of communication and every person has the ability to undertake design with mixed level of success. However, theorists warn that not everyone who undertakes design is a designer (see the earlier information on design by non-designers). Cross (2002) proffers that “*design ability*” is the distinguishing feature of designers, and it is different from the intelligence that everyone possess for making designing decisions as described by Moggridge (2008). Design ability allows designers to perform especially at the level of interdisciplinary thinking that involves design teams. Cross (2002) states that designers execute design activities in teams or individually, and that they have a “*designerly way*” of knowing and doing things.

Figure 3- 6: Hierarchy of design abilities and skills



Source: Moggridge, 2008

From Moggridge’s (2008) outline that is shown in Figure 3-6 and description, it can be seen that design practice will depend on design skill ability and that there are four levels of design skills. Specialist design skills would describe the design graduates who specialize in graphics, fashion, architecture and other design disciplines.

The present design debate is on what else needs to be done to establish design as a discipline breaking out of the pure sciences and pure arts. Design has to build its own coherence for it to hold forte beside the science and arts (Cross, 2007). According to Rittel (1973), design problems are ill-defined, ill-structured, or wicked, and are not the same as the “puzzles that scientists, mathematician and other scholars set themselves.” Design problems are not susceptible to

exhaustive analysis, and there can never be a guarantee that “correct” solution can be found for them. To cope with these ill-defined problems, designers are taught to learn to have the self-confidence to define, redefine and change the problem—as-given in the light of the solution that emerges from their minds and hands. We are advised not to confuse design with mathematics, art or any science. What designers know about their own problem-solving processes remains largely tacit knowledge, that is, they know it in the same way a skilled craftsman “knows” how to perform that skill. They find it difficult to externalize their knowledge, and hence design education is forced to rely so heavily on an apprenticeship system of learning. Teachers of design have to go beyond this knowledge transfer technique and be articulate in what they are imparting.

Designers are particularly skilled in what Cross (2007) describes as “metaphoric appreciation.” This refers to having the ability to read the world of goods, translating back from concrete objects to abstract requirements, through their design codes. This allows designers to conceptualize new ways or systems of doing things, develop new products and improve existing products.

3.7 *Engineering design process*

The professional designers include those designers who have acquired academic training and those who have undergone structured apprenticeship training. The basic process of design that they employ is derived from the six step process outlined by Brunelleschi in the 1420s. Various adaptations have been developed depending on some considerations. Some specific MSE models are discussed later in the thesis. However, the models such as Hybrid Product Design process were developed for sofa informal sector products. In this section the focus is on sofa and the considerations that guide the design have been clearly stated. What is clearly shown in the examples is that there is more attention to the design, customers’ needs, function of the sofa and environmental and technological concerns. The sources of inspiration, the form and functional aspects of the sofa are infused in the training of designers. In both cases the training legitimizes the definition of a designer as, “a person who has undergone training to qualify as designer,” (Cross, 2008). The effectiveness of design training is a subject of another research. Some examples of sofas produced through the training or understanding of design are presented. The objective of this research was not to establish the difference between these two higher levels of skill acquisition so

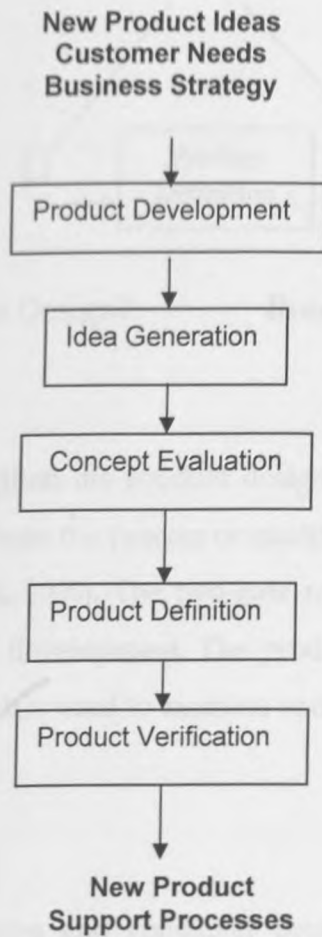
what has been presented are insights that may not be comprehensive but that serve the objectives of the research. They provide a basis from which to appreciate the MSE sofa design.

Engineers are trained to produce products based upon technological capabilities or technoware (production tools and facilities necessary for manufacturing operation). Engineers like the experienced and professional designers can follow various processes in order to realize products. The Gate Realization Process (GRP) that is described below is one such process. It is not specific to sofa design but can be applied to a broad product category. It is selected for discussion because it is comprehensive and outlines clearly some of the phases in product engineering that seem similar to the sofa production process. Earlier reference to the work of Ndua and Ng'ethe (1995) with Nakuru furniture and metal artisans, it was stated that there was a correlation between quality of product and the "technoware".

The Gate Realization Process (GRP) is an engineering design that aims to introduce discipline into the design process, focus attention on quality of execution, and speed up the process through the use of the Stage-Gate. The success of products begins with new product ideas and customer needs, including input from marketing, Research and Development (R&D), and finishes with high-quality *manufacturable* products for the end user. In order to follow the process through, entry and exit criteria are put into use. Process or quality gates help to verify that that the necessary activities are completed and necessary elements are present before moving on to the next phase in the design process as outlined in Figure 3-7 and Figure 3-8. In order to follow the process through, entry and exit criteria are put into use. Process or quality gates help to verify that that the necessary activities are completed and necessary elements are present before moving on to the next phase in the design process as outlined in Figure 3-7 and Figure 3-8. In a simple two-gate realization process, two quality gates are introduced into the process before and after the Product Definition (PD) phase. The gates are evaluation points at which the decisions on whether to "go" or "no-go" decisions are made as shown in Figure 3-8. The aim of the Stage-Gate process is to introduce discipline into the process, focus attention on quality of execution, and speed up the process. The steps show how new products begin and end with the launch of a new product through the activities (stages/phases) and decision points (gates). For example, at the pre-Product Definition phase gate, the criteria to go may be a check that the business case and marketing plan is viable, a list of

customer needs associated with the concept is complete, key product requirements and functions are prioritized.

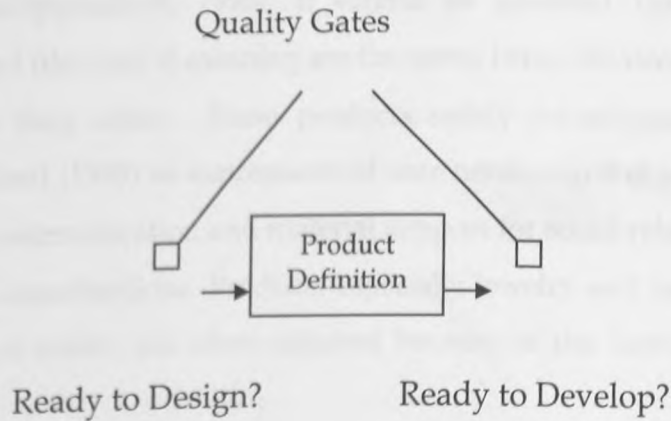
Figure 3- 7: Gate realization process



Source: Chao and Ishii, 2005

In the engineering design process two approaches are discussed in which one is the *phased review* process and the other, *the process gate approaches*. The phased review process can be viewed as a relay race in which *phases of the review* are segmented with sequenced activities.

Figure 3- 8: Two-gate realization process



Source: Chao and Ishii, 2005

This in turn seems likely to lengthen the product design process. *The process gate approach* have activities running concurrently where the process or quality gates manage the entry and exit of the various activities (Chao and Ishii, 2005). The two-gate realization process is an efficient way of approaching product design and development. The product engineers are taught the process as part of their training. This approach is used to examine and compare with that employed by MSEs.

3.8 Furniture styling

Studies on furniture design choices and consumer profiling are surprisingly rare despite its significance to the industry and consumers (Yoon, Oh & Cho, 2010). To underpin knowledge on how people make furniture choices and their style preferences is difficult, but using a 3D virtual showroom in the United States of America, these researchers established that people have different priority considerations among eight features—style, color, price, construction quality, ease of maintenance, comfort, material, and matching with other items—as well as different furniture style preferences between different gender groups (Yoon, Oh & Cho, 2010). The research worked around styles from three categories namely, traditional, modern and casual. Product semantics is also a factor that has contributed to economic success for designers. Semantics refers to the experiential fact that people surround themselves with objects that make sense to them, they can identify as to what they are, when, how, for what, and in which context they may be used (Krippendorff, 1995). Products such as furniture need to reveal, communicate, or present themselves in the experiences

of people. To be of use to people, products must be capable of this kind of presentation. "What something is (the totality of what it means) to someone corresponds to the sum total of its imaginable contexts" (Krippendorff, 1995). It cannot be assumed that form (the designer's objectified meaning) and (the user's) meaning are the same; hence the need to understand product semantics to see how they relate. Some products satisfy sociolinguistic needs. These were discussed by Krippendorff (1995) as expressions of user needs; signs of social differentiation and integration; content of communication and material support for social relationships. Designers are not free from identity considerations. Products especially jewelry and fashion, do not adhere to utilitarian principles but rather, are often acquired because of the "sociolinguistic" values they represent.

"The feeling of belonging to being part of larger social entities, classes, professional groups, or religious groups is mediated largely through the deliberate use of particular objects. Objects such as furniture can be used as examples of ways to express belongingness, shared attitudes, or common privileges" (Krippendorff, 1995).

Furniture styling that includes sofa styling is undertaken to meet the design objectives of the sofa. The design principles discussed earlier in this chapter are realized in a style and some of the determinants of style are people's perceptions, preferences and well-being. This research investigated the motivators for style preferences in sofa sets, alongside the design principles that MSEs sofa-design entrepreneurs may put into consideration.

3.9 *Anthropometric measurements*

In order to develop usable products, human needs and requirements have to be taken into consideration (Bergquist & Abeysekera, 1996) because every product is designed based on human measurements: every tool, every desk: every car seat and every chair. Quality Function Deployment (QFD) is one method proposed by Bergquist and Abeysekera (1996) to systematically match human needs with product characteristics, which can help improve product quality. When applied correctly, the QFD results in "higher customer satisfaction." Matching human needs to

product characteristics requires application of anthropometry. Anthropometric measurements are taken using an anthropometer, tape measure or calipers. For furniture, anthropometry includes body sizes of users' as measured from the shoulders, elbow, knee and popliteal height, buttock popliteal length and hip breadth. Most of the contemporary furniture such as tables and chairs are standardized according to geographical or country region. For example, the United States of America depends heavily on data from the U.S military personnel and the Air force. The NASA Anthropometric Sourcebook is probably the most referenced data set that presents anthropometric data on fifty-nine dimensions for each of twelve different populations' from NASA astronauts to Japanese civilians (Ferguson, 2007). To be duplicable, the measurements must be made in the same manner on different individuals, and the subjects must assume a stereotyped static posture, during measurement. Studies based on dynamic measurements should contribute to human comfort, efficiency, convenience, and safety (Dempster, 1955). In order to satisfy the largest possible audience, designs regularly adhere to one of the three philosophies: design to fit the average person, design to fit the extremely large or small person, and design to accommodate a wide range of the people (Ferguson, 2007).

Anthropometry when properly applied will provide comfort to the users of the sofas. Proper measurements increase the level of comfort to users. Standardization of measurements allows for ease of accurate replication especially where large quantities of sofa are manufactured. The Asian and European masters from whom the history of furniture in Kenya can be traced, placed a lot of emphasis on anthropometry. In the application of the design principles, construction of the sofa depends upon accurate anthropometry coupled with well calibrated equipment.

3.10 Quality in furniture

The quality of products is often expressed as adjectival construction such as "fast cars and sleek performances" which can be referred to as attributes (Krippendorff, 1995). Beyond the simple categorization, Krippendorff (1995) describes subordinate categories for example, that differentiate a chair and a high chair. Categorization and attributes creates species. Physical objects such as furniture have dimensions, chairs are more or less comfortable to sit on, and the dimension of comfort is an unalienable part of the definition of a chair (Krippendorff, 1995). In furniture design, technology plays an important role. "The revolution (technology) has opened a door for perfection

and ease in the manner in which work is done" (Sogo, 2010). This quote is taken from an article on technological opportunities for carpentry in Kenya. The technology that was being referred to includes modern machines (that make work easier) such as panel saws, edge banders and multi-borer machine (used to drill holes for quick assembly). Bosire who received training in the Netherlands was quoted by Sogo (2010) as saying,

"My stay in the Netherlands was an eye opener. I was introduced to computers, which was interesting, as I had never seen a relationship between computers and carpentry...but most of my training I received as an apprentice at BG Bison. BG Bison has a design centre which carpenters use to help their customers plan their kitchen, furniture and wardrobe requirements."

The design centre at BG Bison, helps the carpenters get a photographic 3-D diagram which can be modified according to customers specifications, from the diagram, precise list of components and a quotation. This saves the customer money and time and gives the carpenter a professional quotation and precise working plan.

Quality furniture, including sofa, is a result of proper dimensioning (anthropometry), application of design principles and selection of an appropriate style. Proper machinery and equipment are expensive and it is observed that most MSEs do not have sufficient resources. So, this researcher investigated the types of machinery entrepreneurs employ and their source.

3.11 Summary

This Chapter has discussed design theory and research with insights into the nature of design studies. It refers to the abstract nature in the practice and research into design that requires understanding of tacit and explicit knowledge. The codification or transition of tacit into explicit knowledge has elements of interpretation that are typically subjective requiring contextualization. Development of design theory from principles and design methods is discussed. Design is multi disciplinary and can be either experimental or generative, where one results in a product or system while the other results in a philosophy or theory. In both cases, the methods of design research can

apply scientific and/or social research methods. A qualitative research like this one has used ethnographic methods for example that are typically associated with social research. Design hierarchy of knowledge is presented that asserts that for one to be considered as a designer, he or she needs to have some training in design. At the highest level, he or she needs to explain and articulate design. The choice or selection of any principle for use in design is based upon certain considerations that include the consumers, the environment concerns and sustainability. The theory will apply within certain contexts just like the examples that have been presented in this chapter. Of importance is that when designers fail to meet the needs of the population then it creates room for non designers as exhibited in the chairs from Shanghai, to flourish in supplying their products to the population. The information assists in placing the MSE capabilities on the hierarchy of design knowledge and abilities (Figure 3-6). In later discussions, the research attempts to establish how far or near the MSE entrepreneurs are to professional designers or to "non designers" according to their abilities.

4.0 SKILL ACQUISITION

4.1 Overview

This chapter examines the process of skill acquisition within the micro and small enterprise sector with a view to establishing its relationship with MSE design practice. It examines some of the initiatives that the government has taken to provide effective apprenticeship training especially within the 8-4-4 system of education that was introduced in 1981. Much of the literature is derived from the 1980s and 1990s and may appear outdated, but it should be acknowledged that the information is still relevant in so far as there has not been a major shift in training and education. Moreover, human resource development is one of the major drivers towards the realization of Vision 2030. In the vision it is stated that the goals for education is "to have globally competitive quality education, training and research for sustainable development." Quality formal education is desirable but it is not accessible to most of the youth who are forced to find alternative ways of acquiring skills. From the literature it is noted that skill acquisition in MSEs in Africa is almost entirely undertaken through apprenticeship (as shown by evidence from studies of West Africa, Ghana and East Africa). However, the apprenticeship practiced in many parts of Africa is different from that practiced in Europe in that the African apprenticeship leans more towards traditional apprenticeship whereas the European model of apprenticeship was more regulated by institutions such as the Guilds.

The first part of this chapter focuses on apprenticeship - benefits, policies, institutions and quality; the second part focuses on design practices mostly derived from reports by professional designers working in the area of product development. This includes work by designers Amollo (2007), Mwasi (2006), Donaldson (2006), Onyango (2003), and Osanjo (2003) who have experience in MSE product design practice and processes. Research done by social scientists including Abuodha (1995) and Ndua and Ngethe (1995) has also been cited. Apprenticeship training has been drawn from work by Birks *et al* (1994), Mburugu (1993), McCormick (1993) and Walsh (1991) among others. The literature provides insights into the significance of effective and efficient apprenticeship training as a catalyst for MSE growth. On product design, the designers have suggested various models including Hybrid Product Design Model, Product Team Model and Engineering Product Design model.

4.2 *The 8-4-4 System of Education*

Most Kenyans have access to formal education especially at primary school level. Primary school education is free and every child is expected to attend school. Secondary school is subsidized and therefore, once again, the students are expected to pursue secondary education. Vision 2030 is the blue print for the achievement of industrialization of Kenya. Human resource development is listed as a priority for government to support the three broad pillars that are social, political and economic. Out of these programmes, it remains to be seen which one reaches out to MSE operators in Gikomba market. The present 8-4-4 system of education adopted in Kenya in 1981 encompasses eight years of primary school, four years secondary and four years of University education. Following its inception, the system has largely been seen to be successful although it continues to face several challenges. For example, while assessing its ability to impart useful skills for self employment, it was observed that "it was unlikely that the 8-4-4 education system would provide skills to the students unless a new approach to teaching was adopted"(Oketch, 1995). This statement was followed by an analysis of the implementation strategies for 8-4-4 that showed that the government was not able to implement the system effectively. Some of the problems lay in lack of adequate infrastructure, equipment and machinery for the practical oriented system and inadequate trained teachers. By 2009, there were 6 million children enrolled in primary schools. The announcement of free primary education by the government in 2002 saw a rise of 33% from the previous year. About fifty percent of those who completed primary school proceeded to secondary school, but the other half was forced to look at alternative training in order to secure employment. Those who chose to proceed with education joined Youth Polytechnics, Technical Training Institutions, Institutes of Technology, National Industrial Vocational Training Centres and Non Government Training Institutions. The government saw the need to create the Ministry of Research, Technical Training and Applied Technology (MRTTAT) in 1988 as a coordinating ministry for the various non formal training programmes including vocational and apprenticeship. It had the mandate to develop technical training policy, education and vocational training in the various institutions. By 1997, MRTTAT had been disbanded and its responsibilities were once again shared among various ministries. By 2002, the government created the Department of micro and small enterprises (MSE) under the Ministry of Labour.

4.3 Apprenticeship in Kenya

Education and training are key to the realization of industrialization. In the Vision 2030, there is mention of Science, Technology and Innovation (STI) as being strengthened. Technical, industrial, vocational and entrepreneurship training (TIVET) institutions are challenged to match skills to market demands. However, the training is hindered by inadequate facilities as well as institutions. The government set out to upgrade TIVET institutions to enable them to provide training in skills consistent with emerging technologies and also introduce a national system of certification (Republic of Kenya, 2007). As at 1995, there were over 600 institutions involved in technical and vocational training that included over 50 NGOs offering some training to informal sector operators (Oketch, 1995). However, it was noted that this training cannot match the informal sector training that operators provide to new entrants in the informal sector through apprenticeship. The Vision 2030 publication acknowledges that there is no updated information on the TIVET institutions, however, it can be expected that their numbers have risen in proportion to the total population and demand.

4.3.1 Benefits of apprenticeship

As stated earlier, updated literature on apprenticeship in Kenya is not available, however, literature from other parts of the world shows that in micro and small enterprise, traditional apprenticeship is an effective skill transmission system that is dynamic, capable of growth, flexible, and costs the government nothing (Birks *et al*, 1994, Williams 1980). However, apprenticeship in Kenya is not as well defined as it is in West Africa (Walsh, 1991) or Europe. In Ghana, apprenticeship is still the preferred method of passing skills from master craftsman or parent to children. In Ghana initiatives such as Technology Consultancy Centres (TCC) were set up to promote intermediate technology among the small enterprises. However, interventions such as TCCs provide complementary vocational skills that are necessary in critical areas (Frempong, 1993). In Nigeria, work groups are formulated and stratified. The typical enterprise employed apprentices, journeymen, and paid labourers in addition to some full and part time family workers (Williams, 1980). The Nigerian apprenticeship system in small manufacturing was explained as an adaptation of long-standing forms of traditional craft education. The apprenticeship is highly formalized and content modified to the needs of the economy; the mutual rights and obligation of

the trainees and their employers are highly formalized and the master-apprentice relationship continued to be governed by values based on traditional social system. In Kenya, the training is a blend of on-the-job training and internship that is loosely defined in terms of depth, period, costs and content. The trainees do not pay fees, they are not offered written contracts, and have no fixed job description for the period. But, it is an increasing economic activity that prepares trainees for jobs in the formal sector; it absorbs and trains increasing numbers of unemployed youth who have no alternative (Walsh, 1991).

Some positive issues that have been identified in apprenticeship training include its impact on the formal training as the youth opt for it away from the formal institutions; it has endeared itself to women maybe because of its flexible nature. There are inefficiencies in the present style of apprenticeship training in for example, the fact that it can take much longer than would formal training with the same content would take (Birks et al, 1994, Walsh 1991). "In extreme cases where the apprentice stays for five years or more years it may be difficult to draw a dividing line between apprenticeship and cheap labour," (Walsh, 1991). It is acknowledged that informal sector training is already moving towards a greater degree of effectiveness and efficiency.

4.3.2 Policies for development of apprenticeship training

The Vision 2030 that is the road map towards industrialization outlines clearly the role that MSEs will play in the creation of the 500,000 new jobs per year. The Economic Stimulus Programme (ESP) identifies the development of Constituency Industrial Development Centres (Republic of Kenya 2009) that will host Jua Kali sheds, common manufacturing facilities and business incubators among other things. Framework for provision of training and access to technology; access to markets and product diversification are some of the recurrent issues in regard to goods and services. Intervention in the form of on the job, refresher courses, and formal training are some of the interventions pursued by Ghana. Institutions such as the National Board for Small scale Industries (NBSSI), Technology Consultancy Centre (TCC), Ghana Regional and Appropriate Industrial Service (GRATIS) and the National Vocational Training Institute (NVTI) are aimed at promoting the SSEs "technological capability so as to be very competitive." As a result of these interventions, it was reported that Ghanaian SSEs have achieved an improved level of technological capability. They have also attained a higher level of collective efficiency. However,

Frempong (1993) cautions that sustaining such competitiveness requires access to technical and vocational training by both the entrepreneurs and the apprentices. Furthermore, the ESAURP report of 1993, recommended an integrated system of apprenticeship training in which industry needs continuously feeds into the training. That "organized steps be taken to improve the forecasting of technical manpower requirements...with a view to avoiding mismatch and possibly, also, fostering mutually beneficial specializations, at the appropriate centres."

The problem of increasing numbers of school drop outs first appeared in the Gachathi report of 1975 that acknowledged that self-employment was the only feasible solution for many of them. Of importance is that the report recommended specific subject areas that needed to be revamped to prepare students adequately for self employment. These included agriculture, home economics, carpentry, pottery and mechanics. Arts and crafts, woodwork, masonry and bricklaying, and business education were seen as important in primary school to deepen the students' numeracy, scientific and literary skills. Most of the recommendations of the Gachathi report were not implemented because of lack of funds (Oketch 1995). With time, the problem worsened and by 1984, the Mackay commission was appointed to find solutions. Mackay recommended the review of education from the 7-4-2-3 system to the present 8-4-4 system. The 8-4-4 system was supposed to see the teaching of technical subjects such as carpentry, home economics and crafts back in the syllabus for primary schools. The 8-4-4 system took effect in 1984. Moreover, the system was successful in other more developed countries such as Canada. What was not adequately addressed was the capacity and resources to implement this drastic departure from the old system. The focus of students and teachers remains on passing examinations and not imparting life long practical skills.

There have been several policies to address provision of training. The Kamunge report (Republic of Kenya 1988) emphasized the provision of vocational and entrepreneurial skills as part of the country's overall training policy. The Ndegwa report (Republic of Kenya 1991) discusses the financing of education and training and proposed a greater sharing of costs to relieve the government of the heavy burden of meeting the costs of training especially at post primary levels.

Sessional Paper No. 6 of 1988 on Education and Manpower Training for the Next Decade and beyond recommended the introduction of entrepreneurship education in all levels of training

programmes. Of note is that the policy recommended the establishment of Small Business Centers (SBCs) within technical institutions in the country. SBCs were to facilitate the development of the Jua kali and small enterprise development and promote entrepreneurship among rural communities. Sessional Paper No. 2 of 1992 (Republic of Kenya, 1991) on Small Enterprise and Jua Kali Development in Kenya emphasized the promotion of small enterprises through the development of enabling environment. Although this paper remains as the most comprehensive policy statement on the Jua Kali development, many of its strategies have not been realized. For example, in the five year development period 1989 - 1993 there was need to create 1.9 million jobs, 31% (587,000) were to be in the informal sector. To realize this goal, more incentives and infrastructure development was required and enhanced private sector involvement. These aspirations have been contained in subsequent policies but success has been elusive. Vision 2030, the blue print that will steer Kenya into industrialization by the year 2030, identifies the need to create at least 500,000 jobs each year, most of them in the micro and small enterprise sector (Republic of Kenya, 2007).

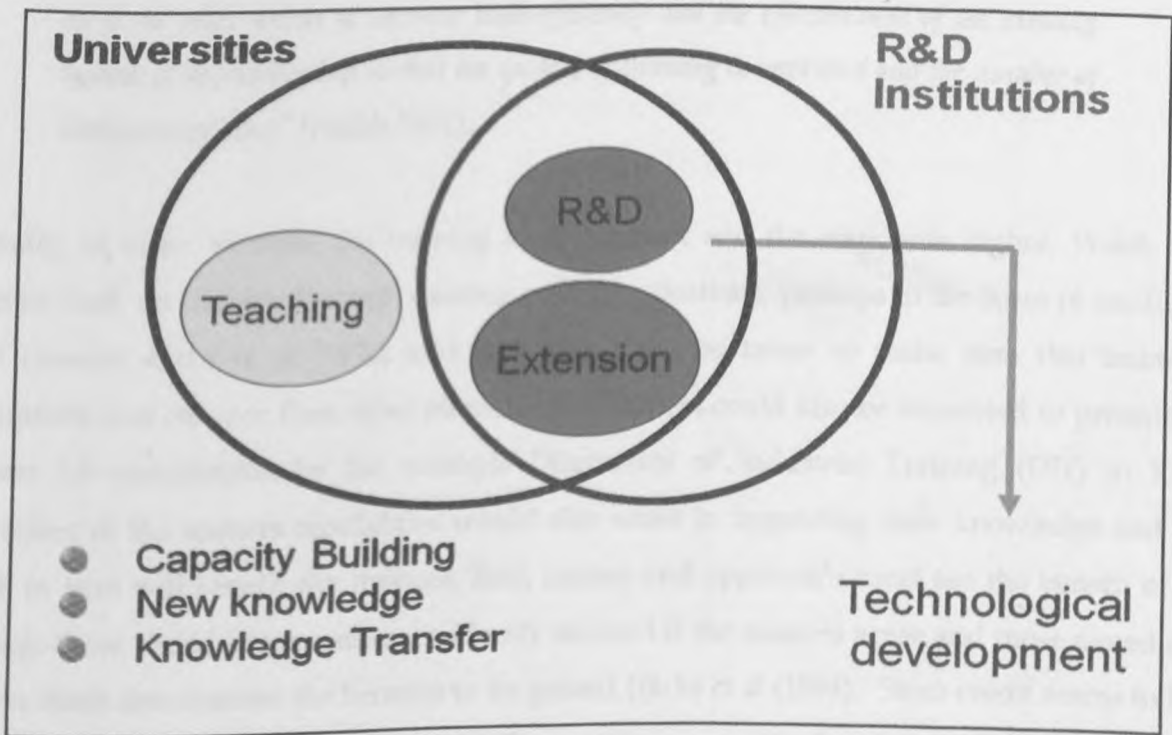
After the disbandment of the Ministry of Research, Technical Training and Applied Technology (MRTTAT), the coordination of informal sector training was redistributed to other ministries. The Ministry of Labour was given the mandate to coordinate the development of the micro and small enterprises. The Department of Micro and Small Enterprise Development (DMSED) was formed in 1992 as Directorate of Applied Technology. The department resulted from the merger of the division of Small scale and Jua Kali enterprises and the Directorate of Applied Technology in the year 2000 and renamed the DMSED. Although huge amounts of money have been spent on MSEs through many projects/programmes in recent years, their impact on the survival and development of the enterprises has been low, as their mortality rate has remained high (www.labour.go.ke).

4.3.3 Institutions that Support Apprenticeship

The pillars of growth of the MSE sector are institutions that include public training institutions, research institutions and vocational training centres. It was observed by Oketch (1995) and Osanjo (1994) that NGO training and support for MSEs is limited and not sustainable. Oketch (1995) advocated for public institutions to integrate programmes for MSEs for sustainability. Osanjo (1994) recommended that NGOs interface with micro finance and public institutions for

sustainability. This is because, much of NGO support is short lived and varied according to the whims of the donors. This means that even a good programme such as the ApproTEC programme discussed elsewhere in this thesis, has a pre set life span after-which it must end. Formal institutions within Nairobi that should directly be involved with MSEs include the MSE department of the Ministry of Labour, because it has the mandate to mobilize and build capacity of the MSEs. The universities, for example the School of the Arts and Design (STAD, University of Nairobi) undertakes research and development on the MSEs and products from the MSEs such as this thesis; as such they have information on the MSEs product needs. Institutions such as the Kenya Industrial Estates (KIE) that was revamped in 2010 is focusing efforts on capacity building for MSEs and the furniture makers form part of this target group. Kenya Industrial Research and Development Institute (KIRDI) undertakes research and development on various products, raw materials and processes and they can show some interest in furniture that affects such a big percentage of the population. In 2006, Moturi and the then Director of KIRDI, Professor Ogada presented a proposal on how technology can be sustainably transferred to MSEs. Figure 4.1 shows an outline of the proposal. It took into consideration the various public institutions that are stakeholders in the growth of MSE sector and industrialization of the country. It can be seen that technology transfer is within the mandate of these public institutions and that there is an Extension component in which technology transfer takes place.

Figure 4- 1: Mandate of Universities and R&D institutions in technology transfer



Source: Moturi and Ogada, 2006

It is acknowledged that technological learning by firms is an interactive process involving other firms as well as key players within the economy. Subcontracting arrangements, buyers and suppliers, local universities, public and private R&D institutions and other agencies can be important sources of scientific and technical information and technological learning for firms (Mytelka and Tesfachew (1998). From observation and the discussions on collaboration and linkages has not been operationalized so that in Kenya today, the institutions and perceived beneficiaries are not communicating.

4.3.4 Quality and Efficiency of Apprenticeship

Many more school drop outs go through informal training than even the formal education and vocational training combined (Oketch 1995). However, the quality and effectiveness of the training remain issues that continue to affect apprenticeship training.

"The alternative to providing training for the informal sector is to strengthen training by it, in other words to increase both efficiency and the effectiveness of the existing system of apprenticeship so that the quality of training is improved and the number of trainees expanded" (Walsh 1991).

Secondly, in order to make the training more efficient and the standards higher, Walsh (1991) suggests back up training through existing public institutions, perhaps in the form of modules or short courses. Birks et al (1994) add that care must be taken to make sure this training is appropriate and cheaper than other alternatives. Trainers could also be requested to present their trainees for examination by for example Directorate of Industrial Training (DIT) in Kenya. Upgrading of the trainers capabilities would also assist in upgrading their knowledge and skills which in turn will benefit the trainees. Both master and apprentice must see the benefit of such training; those aimed at apprentices, will only succeed if the masters agree and those aimed at the masters must demonstrate the benefits to be gained (Birks et al (1994). Since credit seems to be an impediment to informal sector growth, skill upgrading or motivation for trainers, may be tied to credit intervention. This Walsh (1991) suggests could attract NGOs who are effective in providing focused support to interest groups; and are able to deliver efficient low-cost training.

Birks et al (1994) suggest that apprentice training may include weekly training (a few hours) that relate to what apprentices do in their trade. In turn, the apprentices will transfer what they have learnt to other in the enterprises including the master. This would in turn affect standardization in the trade. For the masters, training may be directed at increasing productivity and introduction of improved products. Masters could benefit from study tours, they may benefit from financial incentives for training and outstanding masters could be recognized and recruited as part time consultants. Masters could benefit from measures designed for trade associations in which they are members. Masters and formal trainers need to meet and work out areas where they can work jointly to meet local training needs. Weak areas in the traditional apprenticeship justify positive and careful intervention. Investment in such support could yield spectacular returns through diversification and enhanced productivity. These observations seem to support the intensification of training in design for apprentices and masters engaged in sofa making.

4.4 MSE Design Skill Transfer Methods

Apprenticeship training is an appropriate method of skill and knowledge transfer for MSEs. However, design is evidently not given any consideration. It may be necessary to establish the reasons for this. In the technology transfer (Figure 4-1) framework, design is not one of the skill that has been catered for. However, this does not mean no work has been undertaken in the transfer of skills and knowledge. Design researchers and experts have been involved in MSE activities in areas such as product development and design and marketing. This has resulted in successful products most of which are developed for tourist markets and for other export markets. The literature presented here is from such interventions. It is taken from reports and publications undertaken by designers who have participated in the product design processes, design researches that have been undertaken by designers, social scientists and institutions. The need to improve MSE products arise from the fact that the products are unsatisfactory with various flaws including dis-mantable parts, poor quality, lack of variety and lack of creativity (Onyango 2003, ACEG 2005).

It was established that design research has two streams - process and generative. Designers who have contributed to design process research include (Mwasi, 2006, Onyango, 2003); research on low technology (Abuodha, 1995); and inadequate attention to the market needs (Osanjo, 2003). Furthermore, MSE products are found to be monotonous because they do not have specialist design skills to undertake successful product design (Abuodha, 1995).

Abuodha (1995) and Ng'ethe and Ndua (1995) undertook research in the Jua Kali production processes with a focus on the technology that was employed. One of their recommendations was that a design expert be engaged to undertake a product analysis in order to underpin the issues of product flaws that they could not necessarily attribute to the technology that the Jua Kali were employing. Donaldson (2006) contributed an approach that examined the Jua Kali production from an engineering perspective.

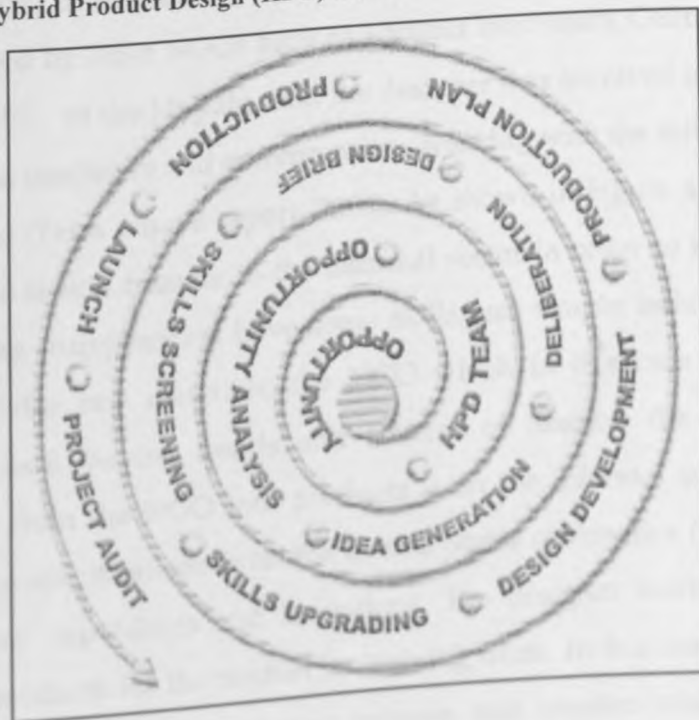
Amollo (2007) undertook research into the design process as used by Jua Kali pottery makers in Nairobi. She established that the potters rely on informal brainstorming, imitated designs and ideas from customers as their sources of design ideas. The need to design or create is driven by the need

to generate income and availability of raw material. The potters rely on informal training for skill and knowledge for design and production.

4.4.1 Hybrid Product Design Method

The Hybrid Product Design (HPD) Method outlined in Figure 4-2 is one of the proposed methods of achieving suitable products from the Jua Kali sector (Mwasi, 2006). The elaborate process involves "gate" process type of process in which reflection and evaluation is in-built into the product realization process. Mwasi (2006) provides a significant recommendation for improved MSE product design. The Hybrid Product Design method, illustrated in Figure 4-2, is a 13-phase MSE product design. The Hybrid Product Design method, illustrated in Figure 4-2, is a 13-phase MSE product design. The product realization process that she believes can result in *good products* from MSEs like the furniture makers. The research and recommendations from the above researchers need further investigation to the context of this research. Donaldson (2006) in his case, for example, used David Ullmans' mechanical engineering design process as a point of reference for MSE product design. And yet, it is known that it is difficult to equate the MSE product design process without clearly identifying the parameters. While MSEs operate at the middle and lower income group levels of the population, mechanical engineering and professional design practice are both undertaken at a higher and more sophisticated market strata.

Figure 4- 2: Hybrid Product Design (HPD) model



Source: Mwasi, 2006

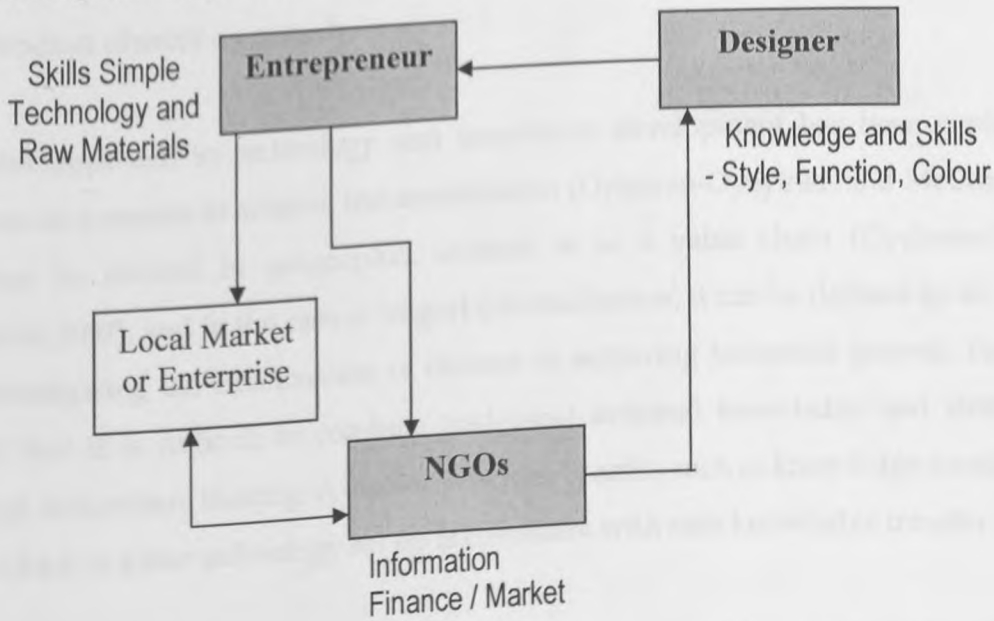
The Hybrid Product Design (HPD) method (Mwasi 2006) and outlined in Figure 4-2 exemplifies the MSE product design problem. The HPD method highlights some of the issues that underlie MSE product design research. The method is based on shared design responsibility as shown by the constitution of a *design team*. However, it is known that one of the characteristics of the MSE sector is that they have between 1 and 10 employees and that they have minimal technical skills. These shortfalls may affect the execution of the HPD model. The HPD method is elaborate and requires design skills for successful implementation. These design skills, the MSEs do not have (Abuodha, 1995). Mwasi (2006) states that the HPD method (although it appears elaborate) can be "fast tracked" and the processes need not take too much resource. In the discussions in this thesis this method is compared to what is proposed after findings from field work.

4.4.2 Product Design Team Approach

Another example of how designers engage with micro and informal entrepreneurs is through product design team approach in which a team is formed with specific inputs into the product development process (see Figure 4-3). In designing products for the United States market, the researcher who is also a product designer worked with artisans and an international NGO - Aid to Artisans (ATA) in Mozambique. This type of product design team approach (see Figure 4-3) has also been used by other NGOs such as Kisumu Innovation Centre - Kenya (KICK), Gatsby Kenya and ApproTEC. In the Maputo case, the designer was involved in product design as part of a team that included marketers and entrepreneurs, working with the informal sector operators in Maputo, Mozambique (Terra Nuova report, 2003). As shown in Figure 4-3, the focus of most of the NGO interventions is skill transfer to the informal sector in order to improve their incomes ultimately. Typically, the entrepreneurs have some skills, use simple technology and a good knowledge of locally available raw materials; the NGO which in this case was ATA, have information on customer needs, buying trends and sources of finance; the designer is a specialist turning information from the NGO into products from the informal sector entrepreneurs. The designer used product specifications from the United States of America (USA) market to match them with entrepreneurs' capabilities and limitations. The designer worked with the artisans to produce acceptable products for the market by training them. In this case these were lamp shades, candle holders, wooden bangles, miniature animals and wooden table coasters. The designer worked

manipulating shapes, colours, wood types (Mozambique has over 100 varieties of wood), sizes and form. The entrepreneurs observed and through trial and error, were able to make acceptable products.

Figure 4- 3: Designers' engagement in product design



Source: Osanjo, 2003

With furniture makers, the designer worked on the technology to produce standardized chairs, chest drawers and tables that are ergonomically sound in terms of measurements. This involved developing "jigs" (for a picture of jigs see Appendix VII) which the entrepreneurs could use and manipulate to produce variations. ATA recognized the need to engage designers in the product design process. The relationship in this regard is outlined in Figure 4-3. The artisan brings technology and expertise in production process, the designer has the knowledge of materials, trends, style and acceptable "quality," while the agency (ATA) has contact with the market and provides seed capital required for product design, experimentation and development. As a result of the ATA project, informal sector entrepreneurs were able to produce acceptable products for the export market. In reflection, it may be said that without the specialist design input, the informal sector operators may have taken much longer to understand and interpret the market needs; or, they may have not been able to understand and interpret the needs altogether. This type of intervention is described in the World Bank report as "innovations in skills development practice". It presupposes that it is a skill transfer process that focuses on product-based training that is linked to marketing assistance. This form of skill transfer is relevant for informal sector operators because

it is short, modularized and practical. However, it has limitations in particular it only transfers a limited set of skills that are optimally used while the product is popular; it does not help in upgrading the basic/theoretical knowledge of the entrepreneurs.

4.4.3 Product cluster approach

The cluster approach to technology and innovation development has been explored by some researchers as a means to achieve industrialization (Oyelaran-Oyeyinka and McCormick, 2007). A cluster can be defined in geographic, sectoral or as a value chain (Oyelaran-Oyeyinka and McCormick, 2007), and in the case of Migori informal sector, it can be defined by all three features. While investigating the effectiveness of clusters in achieving industrial growth, Beerepoot (2008) observed that it is difficult to combine traditional artisanal knowledge and skills with formal knowledge in furniture making. A cluster provides benefits such as knowledge transfer in a flexible manner which in a low technology set up is consistent with tacit knowledge transfer.

In 1995, the informal sector furniture producers were mobilized into a cluster in order to establish ways of improving their products and by extension, their income levels (Matrix 1995). The furniture makers established the Migori Jua Kali society in Migori, Kenya and identified a premise where heavy duty wood working machinery was installed through the support of a donor agency. Some of their improved furniture is exported to Tanzania. Individually, the entrepreneurs would never be able to afford any of the machineries, nor would they get access to external donors. But together, they have improved their products and by extension, their incomes. The entrepreneurs manage the workshop in which heavy-duty woodworking machinery are installed. With the machinery, the entrepreneurs are able to trim, shape and ornament wood so that their products are more appealing and competitive. The designer in this case was able to use her expertise to guide the entrepreneurs into identifying their critical product design needs. The designer was important in creating an understanding between the entrepreneurs that resulted in identifying a need that the sponsor found acceptable. The designer understands the product design capacity of the informal sector entrepreneurs and was able to enhance their product design capacity by introducing machinery and equipment.

The cases discussed above show design practice in the MSE sector can take more than one model depending on the sponsor and the capabilities of the entrepreneurs. Product design development can involve skills transfer, technology upgrading, product diversification, new raw materials and quality. The information provides useful insight, but it also poses more questions for this research. The above cases refer to product design that includes sofa and other products. With all the possible models, one is left to wonder which model can work best for the MSE sofa-design entrepreneurs that are the focus of this research. In order to understand sofa design practice we shall look at some exemplars and trained designers' approaches.

In Kenya one agency that focused on the engineering capacity building for small enterprises was ApproTEC whose training addressed technical capacity of enterprises. The entrepreneurs had to have technology training and consultancy services to entrepreneurs. The entrepreneurs had to have experience and were able to raise between twenty to one hundred thousand Kenya shillings fee for training. Their target was the more mature persons preferably retired civil servants. ApproTEC targeted entrepreneurs who were interested in new technologies and who were operating middle level manufacturing businesses. However, while ApproTEC achieved success, there were some setbacks such as, it was difficult to find these businesses operated by indigenous Kenyans. The short lived success ApproTEC enjoyed is attributed to the fact that it was a result-oriented project; selected only projects that were viable and which it verified through research; it identified the commodity to be produced, the technology to be used and exercised control over who was producing it. ApproTEC trainees were a mature group that had money to risk and therefore took their enterprises seriously (Oketch, 1995). One of the key products from ApproTEC training is the Money Maker sprinkler commonly used by small scale farmers.

4.5 Summary

In this chapter skill acquisition for MSEs has been discussed. The present system of education provides for both formal and informal skill acquisition. This chapter underscores the fact that apprenticeship is the preferred method of skill transfer for MSEs in many parts of the world (Europe and Africa included). However, apprenticeship takes many forms with equally varied content and intensity. The European model of apprenticeship is more formal and controlled by

Guilds that act to set standards and regulate the members. In the African context, informal apprenticeship model with the artisans setting their own standards according to skills passed down through tradition is preferred.

There are also several institutions that are set up to provide non-formal or vocational and apprenticeship training. Many of them are supported by the government, while some are supported by NGOs and others by churches. The institutions provide a structured programme with specific outcomes such as trade test certification and some charge fees. In Ghana MSEs have access to Technology Consultancy Centres that are conveniently situated for access by the entrepreneurs and this may be an approach that could be effective for MSEs in Kenya.

The 4k initiative and the MSE department within the Ministry of Labour were created to enhance the productivity of the MSE sector in Kenya. A model for technology transfer (Figure 3-1) has been proposed that is inclusive and engages with universities and other stakeholders. However, information on the training that is offered is not available. No information was available on design training within this model. At the time of this research, no information on the suitability of these programmes for the MSE sofa makers was available. Therefore the implementation and evaluation of the 4k initiative cannot be said to be successful or a failure at this early stage.

Design researchers have given models for product development based on experience. The products from these interventions have shown that design problems need teams to be successfully solved. These teams are drawn from various disciplines such as social, financial and engineering disciplines. It can be said that these approaches have been successful, although they are different. Like all design problems (discussed in Chapter 3), no single approach can be said to be a solution to MSE problems. A critical limitation in all the approaches is the dependence on external support especially in the form of market or customer needs, and these are also not static. In developing an appropriate design skill development programme, there is need to understand some of the design skill needs of the entrepreneurs. The programme needs to be flexible enough to accommodate the changing social, political, environmental and consumer needs.

5.0 RESEARCH METHODOLOGY

5.1 Overview

In this Chapter, the research methodology is discussed. The research design is a mix of two namely social research and design research. To meet the objectives of the research, one of which was to describe the design process of the MSEs, it was necessary to employ ethnography, observation, interviews and surveys. From design research the use of digital equipment and anthropometric measurement among other data collection tools was employed. The research was mainly qualitative although quantitative data has been presented especially where it proved most appropriate. The methodology included collection of primary and secondary data, analysis of data and presentation. The process of collecting data that was mainly tacit from MSE entrepreneurs and interpreting it into explicit involved collection and sifting through large volumes of data. Thus inductive logic was applied using a "bottom up" approach to data analysis and interpretation. Deductive logic was used in the later phases to complement the inductive logic especially through the use of focus group discussions. In this mixed method of investigation and data collection, applied triangulation was employed to validate some of the findings. Several approaches were used to collect data from the same sources. For example, in determining the technology and production processes, the researchers visited the same enterprises more than once. The mix of research methods meant that reference was made to social and design research methods.

Secondary data was collected from empirical literature, policy documents, social and design researches, conference proceedings, journal articles and other documents. Insights into Design research was acquired from interaction with the Design research community in Italy, 2009, and from conference proceedings. The significance of this meeting is that it focused on the development of design research looking at the tools, trends, methodologies and developments among other things. Primary data was collected from a selected group of four micro and small entrepreneurs who were carefully selected. Information gathered from the four entrepreneurs was verified or complemented with data from apprentices, their customers, the administrative officers in Gikomba market, and other experienced Jua Kali furniture makers who are not necessarily operating in Gikomba market. This information was subjected to focus group discussions with other entrepreneurs and with "professional designers." Analysis of the data collected was an elaborate

exercise involving field notes, narrative, phone conversations, records and visual observations that could only be submitted as photographs.

Collecting and sorting out data while seeking to establish patterns was employed throughout the fieldwork. This back and forth exercise is typical of inductive reasoning building patterns, categories, and themes from the "bottoms up," by organizing the data into more abstract units of information (Creswell, 2007) and focusing on the research objectives. In this case, the MSEs who were the focus of the research are a very heterogeneous group such that, for example, sofa design and production can be undertaken by one entrepreneur, but can also involve up to six enterprises. In examining design issues therefore, the success or failure may be a function of up to six or more entrepreneurs. Furthermore, as discussed earlier, because of the disintegrated sofa making process, this research opted to deal with the frame makers because it proved difficult to accurately deal with all the players. A large quantity of qualitative data was collected as a result of the approach taken and the nature of investigation. Interpreting the data collected was undertaken shortly after the fieldwork to enable analysis and correct interpretation. Later this data was compared with others collected at the same enterprises in consequent visits.

5.2 *Research Design*

This research was primarily qualitative using a mix of social sciences and design methods in data collection and analysis. The unit of analysis was the sofa-design entrepreneur who was the originator of sofa designs. Data collection tools were borrowed from both social and design research such as ethnography and photography. Quantitative data was used mainly to support the qualitative data and to strengthen the representation of facts that could not otherwise be presented in narrative. Sofa analysis was undertaken using an anthropometric scale. Normative research involved the identification of typical sofa design practices as exemplars that were used to benchmark sofa from MSEs mainly in the area of process, dimensioning and material.

Statistical data (Judd *et al*, 1991) was used to complement much of the data collected through ethnography and observation. Data collection instruments were pilot tested on other entrepreneurs operating furniture enterprises in Nairobi's Jogoo Road that is relatively near the research site and bears certain similarities with the research subjects. The pilot site was not too far from the research

site, the subjects were in the same trade of sofa making, they were not "professional" designers. Their responses and observation enabled the researchers to simplify the language and focus the data collection tools such as the interview guide to respond better to the research objectives.

Because this was mainly a design research, it was imperative to employ assistants who were knowledgeable about design issues and terminologies. Most of the data was analyzed by the principal researcher because of the nature and objectives of the research.

Triangulation of the information was undertaken through the use of multiple research assistants to collect similar data; the enterprises were visited on more than one occasion and questions posed to confirm previous findings. The consistency in the answers from the various approaches was used to confirm response. Most of the data has been presented in descriptive form while statistical data is presented in tables.

5.3 *Population and Sampling*

The population and sample was a two step process in which an attempt was made to identify all sofa-design entrepreneurs in Nairobi. Secondly, the selection process to achieve the sample. At the initial stages of the research, it was expected that quite a large number of MSEs engage in sofa design, however through reconnaissance of research area, it emerged that not so many MSEs engage in origination of sofa design. Through the referral and elimination method, the 5 sofa design entrepreneurs who can be said to be the total population of the entrepreneurs who fitted the criteria for the investigation were identified. Out of the 5 the researcher interviewed 4 of them which represents eighty percent (80%) of that population. The fifth respondent was not available by the end of field work. They are owner/managers; they are technically competent and have the skill to dimension and detail sofa design; they are trainers and therefore have apprentices working within their enterprises and, are seen as leaders by their peers within the Gikomba sofa makers. The entrepreneurs who met this criterion were only five.

From observation and informal interviews with entrepreneurs and other City Council officers, it is estimated that there are at least 1,400 persons employed in the sofa making industry in Gikomba market. This includes entrepreneurs, artisans and apprentices. Most of them are freelance operators

who are paid per job done. They are clustered around a reserved estimate of 33 furniture enterprises (this estimate was obtained from one of the City Council officers who walks around collecting taxes and fees). However, it is estimated that there are over 80 furniture enterprises. From observation the number of 80 enterprises seems more plausible, since at the collapse of the Gikomba Jua Kali association in 2007 there were about 70 registered furniture makers. Most of the seventy (70) furniture makers were in the category of 'hammer and nail' entrepreneurs. This refers to entrepreneurs who purchase sofa frames, fabric and finishes from within the market and piece the sofas together within their enterprises. They do not necessarily undertake any design.

The five sofa-design entrepreneurs were identified through referrals whereby the researchers surveyed the whole site where sofa frame making is undertaken along the river banks in Gikomba market. A pre-determined criteria was used to select the sample. If the entrepreneurs were not the originators of the design that they were producing, further prodding was undertaken to establish where they got the designs from and what role they were playing in the process. This elaborate method of sample selection was important because there was little information available on the sofa makers to assist in sample selection.

Other stakeholders who were interviewed included apprentices, informants such as administrative officers and customers. Table 5-1 provides an outline of the entrepreneurs and other subjects who were interviewed.

Table 5- 1: Distribution of sample

No.	Description	No. of subjects	Population
1.	Entrepreneurs	4	5
2.	Apprentices	10	Over 600
3.	Customers	5	Not known
4.	Professionals	10	Over 600
5.	Area Chief	1	1
6.	District Officer	1	1
7.	City Council Officers	3	6
8.	Upholsters	2	Not known
9.	Photographers	2	5
10.	Other entrepreneurs	15	65
TOTAL		68	

Source: Osanjo, 2010

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TOTAL		68	

Source: Osanjo, 2010

The purpose of investigating them was to validate some of the information already collected and also to shed light on the issues that affect sofa production that could not be established from the entrepreneurs themselves. Apprentices were identified at the four enterprises owned by the four entrepreneurs through snowballing (Judd *et al*, 1991) which is not a random sampling method. The application of snowballing method was to identify apprentices through the four sofa-design entrepreneurs. This was done at the enterprises and two apprentices per enterprise were found to be sufficient. Ten apprentices were selected from three enterprises because the fourth enterprise did not have any apprentices at the time of this research.

The five customers were also identified using snowballing method as well whereby the customers were found at the enterprises in the course of field work. The five customers were those who had come to the enterprises and were willing to respond to our questions. The five respondents were seen to be sufficient to represent other MSE customers who visit the sofa making enterprises.

Photographers that were interviewed were found on the Kombo Munyiri Street that is the main street in Gikomba market by the researcher in the course of field work. The purpose of interviewing them was to establish their role and significance in the sofa design process. The two respondents were found trading in photographs on the street.

Upholsters were seen as important for sampling because they provide the upholstery for the sofas. The two upholsterers that were interviewed were found working in the open air on the Kombo Munyiri Street. It was not established exactly how many upholsterers serve the Gikomba sofa makers.

Key informants were drawn from Government, City Council, and staff from furniture outlets within Nairobi. These informants were identified because of the administrative structures within Gikomba market, for example, there is only one chief, one District officer, one District commissioner. The key informants were identified through referrals for example the chief was traced from the entrepreneurs who stated that he mediates during misunderstandings within the industry. The Chief in Gikomba market receives complaints from sofa customers and entrepreneurs too. The District Officer provided information on the relationship between the

government and the entrepreneurs in regard to administrative, regulatory and legal issues. The City Council officers take taxes and levies from the entrepreneurs regularly.

Other entrepreneurs were selected from those who worked within the Gikomba market environment. They provided valuable information on the general sofa industry practice and the design process. They were also used to validate some of the information that was necessary for the research especially the identification of the four entrepreneurs. These entrepreneurs also provided insights into marketing and distribution of sofas, prices and constraints or impediments to the growth of the industry.

Table 5-2 shows the institutions that were investigated. The School of the Arts and Design (StAD) is one of the design schools that educates students in interior design that includes furniture design. It was expected that graduates from these design institutions could have found employment within the sofa industry. The Department of Micro and Small Enterprise (MSE) within the Ministry of Labour was also investigated because of its role as the department that coordinates the development of MSEs. Furniture is one of the preferred sub sector manufacturing activities for the MSEs. It was therefore expected that the department would provide direction and leadership in enabling the growth of the sector through specific interventions such as training or micro finance. Kenya Industrial Research and Development Institute (KIRDI) is one of the pillars of the 4Ks Initiative which is the government vehicle that is driving the growth of the MSEs. The other institutions are Kenya Bureau of Standards, Kenya Intellectual Property Institute (KIPI) and the Kenya National Federation of Jua kali Associations (KNFJKA). They stated that they were yet to start working with the Jua kali sector to develop some industry standards. Since inception in 2007 the 4K has recorded some success in training 1,000 MSE entrepreneurs on mass production of quality products. The two institutions provided sufficient information based upon the objectives of the research. The research sought information from the School of The Arts and Design (STAD) in the University of Nairobi that trains in Interior design with furniture design including sofas as one of the courses. For this reason, it was necessary to investigate the relationship if any, between the knowledge/understanding of sofa design by MSEs and design trainees. For this reason, trainers and graduates were invited to participate in focus group discussions. An invitation was sent to 15 participants and 11 participants responded that represents seventy three (73%) percent.

Table 5- 2: Institutions that were investigated

No.	Institution	No. of officers interviewed	Significance
1.	School of The Arts and Design, University of Nairobi.	2	Provides training for Interior and furniture designers.
2.	Department of MSE in the Ministry of Labour.	2	Information, research and training.
3.	Kenya Industrial Research and Development Institute (KIRDI).	1	Part of the 4K initiative of the government. Undertakes research for development and training.
4.	Kenya Bureau of Standards (KEBS).	1	Provides standards for various products for the local market. Is part of the 4K initiative.

Source: Field data, 2010

The Ministry of Labour, Department of MSE was perceived as an institution that would provide valuable information on structures, legal and regulatory in MSE sofa making. However, interviews with the officers showed that they had very little relevant information on MSE furniture or sofa design. Their resource centre remained closed with access to any documents largely not possible. For this reason, further investigation was found unnecessary. At Kenya Bureau of Standards (KEBS), the story remained more or less the same. They have no standards on MSE furniture products, no reports and no documents. The researcher therefore did not proceed with investigation into KEBS and their role in MSE sofa design. KIRDI was another institution that had been identified for possible investigation, however, preliminary investigation into their research and activities in MSE furniture, revealed that they have had no activity. For this reason KIRDI, KEBS and MSE Department although important to this research were not probed beyond preliminary reconnaissance. The discussion on the role of these institutions in the MSE design practice however is seen as important and therefore was not left at this stage of sampling.

5.4 Variables Considered

Literature presented earlier in this thesis showed methods, processes and design principles that underlie sofa design. This information is summarized to formulate what is defined as variables. It was anticipated that these variables would be comparable with MSE sofa design. In the context of

variables that were relevant, collected from the literature presented in Chapter 3 from experienced and trained designers, sofa design practice research includes:

1. Consideration for customer space needs,
2. Quality - sustainable design identifies with designing sofas that are durable (but not necessarily cheap), use of wood is recommended, however it needs to be efficiently used in manufacture, and needs to be relatively long lasting.
3. Standards in dimension (anthropometrics) - Levy (2002) uses European standards of anthropometrics.
4. Specialization by style - Levy (2002) is known to specialize in one style of sofa.
5. Low carbon emission - in the glues and adhesives used for manufacture,
6. Use of natural fibre for stuffing as opposed to waste materials and fabric or harmful fibre,
7. Production supervision - closely related to quality, Levy (2002) produces his sofas under one roof and the customer is permitted to periodically check on the production.
8. Pricing - sustainable design is not price driven. To some extent price is also not very important to the trained designer providing individualized sofa like the "artistic sofa."

Alongside these variables was loaded the principles of design. Is user centered design or eco design or sustainable design principles considered in MSE sofa design? In the context of this research these features formed the broad benchmarks for investigating MSE sofa design practice. The research did not set out to prove or disprove the variables but rather to see if they are present, if they should be considered and to what extent they are considered in MSE sofa design. The features may not be exhaustive and that is why inductive reasoning is employed. As benchmarks, the research investigated if they hold the same for MSEs and to what extent the MSEs implement any or all of them, or if there were some variables that they put into consideration.

5.5 Data Collection

Data collection was undertaken by the researcher assisted by a team of carefully selected and trained research assistants. In design research, typically the researcher is a design specialist who is able to direct and determine the outputs from the research (Cross 1994). Therefore the research assistants were drawn from the design industry. The research employed semi-structured questionnaires, non participant observation, semi structured interview guides, structured and informal interviews and focus group discussions. As seen in Table 5-3 observation was a very important data collection tool, and it focused on design activities especially those that could not be accurately recounted and narrated by the subjects. Observation was undertaken focusing on the environmental features around which the design activities, the enterprises and the entrepreneurs. Anthropometry is also an observation using anthropometric tools such as rulers, to determine measurements. During data collection, it was necessary to be discrete with note pads and cameras so as not to attract unnecessary attention to ourselves. It was also necessary to speak in "sheng" (a dialect that combines English and Kiswahili that is common in the Eastlands area of Nairobi). Field notes were written in small note books. These were immediately transcribed into reports before the information and details are lost or distorted on return from the field. From the pictures, analysis was undertaken and recorded in the same manner. On a few occasions we were not allowed to take any notes especially with the key informants and we had to rely on recall immediately on return from fieldwork. Details of field notes, schedules and transcriptions are available in the appendices.

Observation was undertaken using field notes and capturing data using photography, video recording and sketches. For example, sofa photographs were used to explain the styles, sketches assisted the researchers in capturing the sofa details of dimension. Some of the variables that were investigated using observation included quality features, sofa style (design), types of stuffing and production process.

Non participant observation was the main mode of data collection using field notes and camera. An observation guide was prepared that highlighted five critical questions that were to be answered. For example, initial visit was to ascertain that the entrepreneur was an owner manager, engaged in design and dimensioning. An overall assessment was made of the enterprise, proof of sofa design and production was established through observation. Appendix II exhibits a report

from a brainstorming session in which the researcher was a non participant observation. The information captured the sofa products, the machinery, tools and equipment. This involved detailed examination of the working procedures and processes within the enterprise. Each enterprise was visited for between three and five times depending on the information needs. A daily record was taken immediately after field work so that the information is not corrupted through memory loss. Non participant observation was also conducted during the brainstorming sessions when the entrepreneurs were engaged in technical development of sofa design (see Figure 6-2). The researcher sat through the session listening and occasionally posing questions to the entrepreneurs.

Product anthropometry: Sofa dimensions were measured through observation and anthropometric measures. A template for a sofa was illustrated (Figure 6-2). Ten (10) photocopies of the template were made. Four were used within the four enterprises and six were used on randomly selected consumers of sofas who had similar sofas, and who were working within easy reach of the researchers. Product anthropometry addressed the variable on standards and dimensioning, including replication.

Interviews were used especially with the MSE entrepreneurs who were the focus of this research. A few leading questions were developed from which the entrepreneurs responded and expounded on issues under investigation. The interviews maintained similar questions although their order, depth and responses were varied depending on the entrepreneurs.

Informal interviews focused on people who affect or are affected by the sofa designs from micro and small entrepreneurs. This included customers, suppliers and other enterprises. This was done through snowballing and referral mainly from the four sofa-design entrepreneurs and other stakeholders. Informal interviews were also used on the administrative officers in cases where the researchers could not anticipate their responses on knowledge and interaction with sofa entrepreneurs. Based on the relevance of their responses, for example, the chief was followed up with a more structured interview.

Semi structured interviews using guiding questions (Appendix Ia) and interview guides with leading questions semi structured interviews were held with specific groups such as customers and

apprentices. These questions were kept discrete and only used by the researcher as a reminder in case important points were forgotten. The guides helped to keep the questions focused and consistent. The guides also helped to keep the MSE entrepreneurs comfortable and not intimidated with the investigations. The interviews took place at the place of work place of the entrepreneurs. Semi structured interviews was also used with apprentices (Appendix VIII) that helped to standardize the information collected and make it easier for analysis. The researcher posed the questions and took notes from the responses. These notes were analyzed immediately after field work. The interviews addressed issues of training of entrepreneurs and apprentices in Gikomba market. This answered the question of how prepared (technically and in design) to produce sofas. It addressed specialization whether by style, techniques, training or other factors.

Focus-group discussion guides were used at two levels. One was with the sofa-design entrepreneurs in which information that had been gathered from them individually was presented to them as a group for verification and confirmation through consensus. The researchers met with them and although they allowed the technical team, for example, to discuss freely, the researcher paid close attention to information related to the objectives of the research and data sought. The second focus group involved professional designers who were used to confirm and triangulate much of the data that had been collected from the field. This was also important because design research is typically subjective depending on the interpretation of the designer/researchers and unless it is subjected to other design experts for consensus it may fail a validity test. For the focus groups the researcher developed guiding questions for discussion based upon specific issues. The sessions were moderated by the researcher. Consensus was reached through open discussion and a conclusion. The conclusion was recorded by an independent session secretary. The researcher posed the issues and the recordings were undertaken by an independent secretary, selected by the group. In this way, further subjective interpretation or reporting by the researcher was reduced. Recordings from focus group discussions can be found in Appendix IV and V.

Table 5- 3: Advantages of selected data collection methods

METHOD	TECHNIQUE	ADVANTAGES	DISADVANTAGES
Observation	Observation involved the identification of the phenomenon to be observed, getting the right tools such as camera, sketch books or note books. Through observation, information on behavior was captured, premise outlays and equipment was collected.	Observation allowed the researchers to capture information that would otherwise be difficult to capture using other means. For example, the design process that was the focus of this research. It would not have been possible without observation by design experts who were able to transcribe "unspoken" activities/behaviour into information that could be analyzed.	A lot of information collected through observation can be manipulated by the observer because observation is a lens seen through the eyes of the observer. However, this was checked by exposing each enterprise to more than one researcher and observing the activities on more than two occasions.
Non-participant Observation	Non participant observation requires the researcher to observe without interfering with the on-going activities. Using observational tools including field notes, photography, video recordings and sketches within the enterprises, observation allowed a critical examination of the entrepreneurs design process, machinery and sofa dimensioning, for example. Much of the information on the Gikomba market environment was collected using non participant observation.	This method allowed the researcher to record non-verbalized phenomenon and visual elements that could only be recorded using visual observational tools such as sofa styling, production processes, equipment and details.	The processes were relatively time consuming as the subjects often do not answer questions directly. Each enterprise was visited several times so that the research did not interfere with production activities. Gikomba Market is peculiar and the environment is not very responsive to "visitors" who are not necessarily customers. We had layers of people to respond to in order to extract small amounts of information. There was possibility of research bias in transcription and reporting of findings. This issue was put into consideration and therefore, the information was checked at least twice before being put into the report.

			<i>Information was also cross checked by other researchers as they made several trips to the same enterprises.</i>
Sofa anthropometry	Observation tools that focused on measurement of sofa dimensions. Recording by sketching and photography. Anthropometrical measurements aid designers in establishing appropriate dimensions for sofa design.	Sofa anthropometry provides standardized measurements according to the needs of the consumers. Comfort in use of sofa is attributed to an understanding of popliteal height and depth. Product anthropometry and analysis will answer the question of how suitable the MSE sofa is to the user's in terms of dimensions considerations.	Anthropometrical measurements can only be undertaken by trained persons. Training is required to be able to develop and replicate accurate measurements. For ease of replication, sofa anthropometry is used to develop "jigs" and "moulds" (see Appendix XI).
Semi structured Interviews	An interview guide was used to solicit responses. The guide helped to keep consistency among respondents. In the case of MSE entrepreneurs, guiding questions were noted on a note book and kept specifically as a reference for the researcher. With an interview guide that outlined the critical information required, the researcher followed the guide and took field notes of the responses.	The researcher is kept on track with regard to the information required without much effort. Analysis of qualitative data collected in this manner is easier to analyze than when the interview is not structured at all. This method was found very appropriate for gathering information from apprentices.	The researcher had to be sensitive to language (spoken and body) and approach. Gikomba entrepreneurs are sensitive to language preferring to be addressed in "sheng". They are sensitive to dress style, and even size of body. Interviews were very time consuming. Interviews have to be relatively short or people will feel imposed upon and may become restless. The interviewer is considered a part of the measurement instrument and therefore can affect the responses from the subjects.
Informal Interviews	Researcher uses schedule/interview guide with open and closed questions. Informal interviews are used to gather information that will otherwise not be made available.	The researcher has the opportunity to probe or ask follow-up questions. And, interviews are generally easier for the respondent, especially if what is sought is opinions or impressions.	Time can be lost on issues irrelevant to

			<i>the topic being discussed.</i>
Focus-group discussions	<p>The researcher develops 5 to 6 questions for discussion based upon the problem or issues to be addressed.</p> <p>Small groups will be identified to be interviewed simultaneously.</p> <p>Recording is undertaken through notes. Session is moderated by the researcher.</p>	<p>It saves on time because the researcher has more subjects responding collectively to issues.</p> <p>It also strengthens responses collected from individual entrepreneurs through other means.</p>	<p>The researcher has less control of outcomes because group consensus is required.</p> <p>The data can be difficult to analyze because the discussion is in reaction to comments of other group members.</p>

Source: Osanjo, 2010

5.6 Data Quality

Efforts were made to consider validity and reliability of data collected especially as the research employed a mix of social research and design research. Validity is given great importance in this research because of the nature of the research. As is the nature of design research and normative research specifically, the researcher identified variables, principles and showed the outputs of their application in sofa design. Design research is typically undertaken by designers and is subjective by nature. The researcher brought into the research her professional knowledge as a designer, trainer and practitioner. A subjective input by the researcher can arise from the fact that they make judgment on activities and competence of subjects that affect the findings, analysis and conclusions drawn from them. Thus validity issues needed careful consideration. For this reason, care was taken to capture data diligently, multiple options were used to capture data on the same issues and report the same. The data collected was put forth before focus groups in order to verify and confirm them. For example the focus group discussion with professional designers was used to check on the designer bias of the researcher. The recording of the deliberations was undertaken by an independent secretary to the meeting. These were used by the researcher to identify the responses of the professional designers. The same approach was taken for the MSEs in Gikomba market.

Construct validity: establishing correct operational measures for concepts being studied. The approach to the research was extensively discussed with research experts to minimize the effects in construct validity. For example, the research took the approach of operationalizing design as understood within the MSE and from their perspective.

Internal validity: establishing a causal relationship in which certain conditions are shown to lead to other conditions, as distinguished from spurious relationships that are illegitimate. In employing inductive approach, analysis and selection is a continuous process that was based upon "everything" and "anything" that the researcher unearthed. This means that the relationships that have emerged were based upon information from the base or "bottom" as the research used a grounded theory approach. Relationships were checked from two or more sources before being accepted as true findings.

External validity: establishing the domain to which a study's findings can be generalized. The subjects under study have been selected through a non discriminatory process based on certain extensive field work. Through triangulation, the findings were confirmed in order to minimize errors in reported findings.

Reliability: demonstrating that the operations of a study - such as the data collection procedures can be repeated, with the same results. Documentation of procedures and data collection processes has been articulated and can be repeated for reliability. We had individual interviews and collected much of the initial data. However, all the data was presented at the focus group sessions for clarification and affirmation. Furthermore, data from fieldwork was also discussed with professional designers so that they provided further insight and affirmation of the findings.

Careful selection and training of research assistants based on pre determined criteria one of which is that they have a good understanding of design processes. A multi pronged approach to each issue picked up in the research process also reinforced the findings. Information was gathered from multiple sources on any particular aspect of investigation. Each research assistant made elaborate field notes on observations, unspoken incidences and processes as well as the responses from the interviews; photographic images were collected to corroborate the notes.

5.7 Data Analysis and Presentation

The research questions that guided the research are such that the data is mainly descriptive clustered around issues as they emerged. Quantitative data has been presented in the form of tables and charts. The quantitative data was analyzed using simple statistical methods of numbers and averages. Of note and very important in Design research is the use of photography and other visual methods to illustrate specific issues under study. Most of the data has been presented in narrative, describing the entrepreneurs' product design decision and activities. Narrative analysis is a strategy that recognizes the extent to which the stories we tell provide insights about lived experiences. Analytical process helps us detect the main narrative themes within the accounts people give about their lives, such as the entrepreneurs. We also discover how they understand and make sense of their decisions and activities. Narrative relies heavily on speech and it was captured through notes from observation and interviews.

Photography: Photographs have been presented complemented by descriptions to explain the circumstances and their relevance to the research. There are several aspects of the sofa design that would not have been explained appropriately without photographs that made the explanation more explicit. Most of the machinery and equipment used in sofa production were photographed and their uses presented.

Video recordings were mainly used to capture information effectively especially during production activities. The videos were examined and narrations developed to explain their relevance to the research. Some of the explanations taken from the entrepreneurs were also video recorded for ease of reference during analysis.

Sketches were also used to collect information. For example, anthropometric measurements of the sofa was collected from ten sofas and tabulated with reference to a sketch that was prepared. Information collected with the aid of sketches was analysed, tabulated and presented.

Cross tabulation: Cross tabulation was applied to data that was collected from the four entrepreneurs who were the unit of analysis. The tabulation provided a quick summary of data for comparison of results according to the objectives of the research. The issues were listed on the left column while the responses from the four entrepreneurs were listed in the other columns under appropriately coded headings. Detailed data from the sofa-design entrepreneurs can be found in the Appendix I.

Tables: Data that was collected from structured interviews such as from apprentices was presented in table form. This is because a more structure question guide was employed to collect information from them covering five main issues (refer to Appendix VIII). The tabulated data was complemented with narrations to explain their relevance to the research.

Diagrams: A few diagrams have been presented developed mainly to illustrate more effectively certain issues, such as the template for sofa that was used to indicate the measurements for anthropometrics. Diagrams have also been used to illustrate the MSE sofa design process and even the Design Extension Services model.

Notes and diagrams that were used during focus group discussions were analyzed and presented in narrative. Field notes were transcribed and clustered accordingly under various headings according to the research objectives.

Semi structured interviews: In semi structured interviews the researchers wrote down a list of 5 questions and used the five questions to gather data. The responses were written in the form of field notes. The use of specific questions to guide the data collection ensured a focused data analysis and presentation (see Appendix VIII). From the questions, headings were developed for analysis and presentation.

Focus group discussions: These were developed around specific topics. With a few questions (see Appendix VI). The notes from the discussions were written and transcribed. On each issue, a consensus had to be reached and recorded. The consensus was then reported under various headings.

5.8 *Summary*

The methodology adopted for the research was a mixed method of design and social research methods that is mainly qualitative although some data is presented in quantitative method. Data was collected using social and design research methods. Survey and ethnography were employed from social research, while design research methods including photography and anthropometry were employed. Social research methods including non participant observation, field note taking and interviews were employed. The population was five sofa-design entrepreneurs who were identified through referrals. Snowballing method was used to identify apprentices and customers while referral was used to identify key informants such as the Gikomba chief. Officers from institutions such as the MSE department of the Ministry of Labour and the University of Nairobi were interviewed. Attention was paid to data quality especially because design research can be subjective thus requiring the researcher to take a position, make judgment and seek to justify it. Data analysis involved qualitative methods such as grouping, descriptions under specific headlines, cross tabulation, sorting photographs to identify the most representative. Descriptions were used to complement the photographs. Other data was presented in the form of tables and diagrams where it was found most appropriate.

6.0 MSE SOFA DESIGN PRACTICE

6.1 *Overview*

This chapter discusses the MSE sofa design practice which reflects the response to the main research question. As discussed in the introduction chapter, the design practice covers the MSE sofa-design entrepreneurs, their level of education and training, experience and exposure; their sources of ideas for sofa, equipment and machinery and market trends. It also includes the design process which is an important aspect of design. All these factors are interrelated and affect the level of satisfaction that consumers draw from sofas.

6.2 *The MSE Sofa-design Entrepreneurs' Profile*

The four sofa-design entrepreneurs were the unit of analysis for this research. Their identification was based on pre-determined criteria that are discussed in methodology. Their profile includes their ages, education and training, experience, equipment and relationship with customers. All these factors were based on the objectives of the research. It was established that the sofa-design entrepreneurs' ages range between 27 and 52 years. The youngest of them had inherited a family business from his father and he had some basic technical training. The entrepreneurs started their enterprises with an average of Kshs 30,000 derived from personal savings and contributions from family. One of the entrepreneurs subsidized personal savings with income from farming activities to start his enterprise (Appendix 1b - G3), another was absorbed into a family business (Appendix 1b - G4), while the other two (Appendix 1b, G1 and G2) started with personal savings. All of them had a desire to start their own business as they embarked on apprenticeship training. Over time, one entrepreneur (Appendix 1b - G1) was able to secure a bank loan to expand his operations. Profits from the enterprises are invested in expansion and other social endeavors such as entrepreneur G3 who is building a Church for his community.

6.2.1 Highest level of education

The sofa-design entrepreneurs' highest level of formal education ranged between Standard 7 and Form 4 with the average at Form 2. One of the four entrepreneurs had a post secondary certificate in carpentry as shown in Table 6-1. The entrepreneurs dropped out of formal school because of poverty and family commitments whereby their father died and they had to take care of the siblings.

6.2.2 Entrepreneurs' roles in the enterprises

The sofa-design entrepreneurs were asked to state their critical function within the enterprises and their responses included undertaking all the functions within the enterprise (G1), the main carpenter (G2), management and marketing (G4). All the entrepreneurs undertake the day-to-day management of the enterprise. They are the main carpenters in the enterprises (G1 and G2) sometimes working alone. G3 for example, is the only permanent employee and he uses casual laborers when he gets big orders. Apart from their roles in the enterprises, the entrepreneurs also act as community leaders (G1 and G2), lobbying with for example, City Council on issues that affect their well being. Gikomba market where the sofa makers are situated is a narrow strip bordering the Nairobi River and several attempts have been made to evict the entrepreneurs from the site without success. The entrepreneurs have therefore been seen as the face of the larger community of sofa makers. Over the past five years stringent implementation of environmental laws by NEMA has forced the entrepreneurs to move away from the river bed, thus limiting their area of operation.

6.2.3 Design training

None of the sofa-design entrepreneurs underwent specific design training. However, entrepreneur G4 acquired technical drawing skills from a post secondary course he undertook. Entrepreneur G3 stated that he was taught design by his master. The design skills that they exhibit as they sketch designs in exercise books for customers, have been learnt through repeated practice. All the entrepreneurs have technical ability to draw out dimensions on the wood for cutting shapes and making their templates.

6.2.4 Other training

The sofa-design entrepreneurs had apprenticeship training ranging from 5 years to 17 years. Most of the entrepreneurs stated that their training involved every aspect of the business. One entrepreneur (G1) was trained by a European furniture maker and to date the European community form the bulk of his customers. Entrepreneur (G2) was trained by an Asian furniture maker and described the training as "intense and thorough." The Asian trainers however, did not provide all round training in all aspects of production, preferring to train apprentices on specific aspects of production. For example, an apprentice could specialize in joinery of the sofa and another would be in upholstery while another in cutting (Appendix 1b -- G2). As a result, each apprentice became an expert in a specific aspect of the production process. During their free time they gathered with other apprentices at Kamukunji grounds and from memory, taught each other aspects of production that they all were not individually exposed to. The entrepreneur G3 underwent informal apprenticeship and although he says that he has 17 years of apprenticeship, it will be noted that apprenticeship and employment in Gikomba market appears like a seamless transition in which apprentices begin to earn some money shortly (within two months) into the training. The youngest of the four entrepreneurs interviewed was 27 years (G4) and after Form 4 he undertook a Certificate course in carpentry. His training included all aspects of furniture making including understanding of wood types and treatment, cutting and joinery, making templates and finishing.

6.2.5 Use of information technology

All the sofa-design entrepreneurs had mobile telephones that enabled them to communicate with their customers and suppliers. Three of the four entrepreneurs had computers with Internet access and one of them had a Fax (G3) machine. The computers help the entrepreneur's access wood and other raw materials and fabric from various countries. Supplies such as mahogany that is good and strong wood is imported from Democratic Republic of Congo (DRC) while most fabric is sought from Dubai. The entrepreneurs keep contact through the Internet. Entrepreneur G4 uses the computer for competitive advantage by downloading new sofa designs from the Internet.

6.2.6 Membership to Gikomba Jua Kali Association

Two of the sofa-design entrepreneurs G1 and G2 were founder members of the now defunct Gikomba Jua Kali Association. Entrepreneur G2 was recognized as a "master" and was involved in the World Bank Jua Kali voucher training programme as a trainer. All the entrepreneurs are aware of the benefits of having a strong association including lobbying the government for assistance. Entrepreneur G3 has been involved with the City Council in lobbying for a suitable alternative site for their operations since they are expected to vacate the present site. When necessary, he has made payments on behalf of the other entrepreneurs to the City Council in order to desist from forceful eviction. The same entrepreneur is also lobbying for recognition of their economic activities and support from the Government through the Ministry of Labour. Apart from the Gikomba Jua Kali Association, there are about 12 welfare groups operating within Gikomba (see Appendix III).

6.2.7 Customer Interaction

Customers are important in the MSE sofa-design design practice because they initiate the process. Sofa-design entrepreneur G1 states that his customers come to him from referrals and that their main concern is quality. His prices are higher than most of the other entrepreneurs because he focuses on providing quality in form of wood types, upholstery, strong frames and superior workmanship. Entrepreneur G4 also gets customers through referrals and therefore assumes that the customers are satisfied with their sofa. Entrepreneur G2 has a few "big" mainly European customers whom he services and most of his work is done away from the enterprise. Entrepreneur G3 and G4 are quite detached from their customers and they do not follow up to establish how their sofas are used and whether the customers are happy with their finished sofas. Table 6-1 shows a summary of the entrepreneur's profile:

Table 6- 1: Summary of sofa-design entrepreneur's profile

Variable	G1	G2	G3	G4
<i>Age</i>	42 years	52 years	47 years	27 years
<i>Level of formal education</i>	Form 2	Standard 7	Form 2	Form 4 and Certificate
<i>Role in the enterprise.</i>	He works alone most of the time. Does not have regular apprentices.	He is the main carpenter. He is never away from the enterprise for even one day. Overseeing every activity.	The only permanent employees are himself and his brother. The rest are casuals and trainees.	Management. He does very little work now. Concentrates his efforts on customers, sourcing raw materials (wood and fabric).
<i>Other training (informal apprenticeship)</i>	6 Years Undertook various duties in all operations of enterprise.	Over 10 years covering furniture making and "everything" in production.	Over 17 years in Gikomba including apprentice time. Covered all aspects of production.	5 years. He is absorbed into a family business. Has knowledge of furniture production and design. Uses the internet for support.
<i>Design training</i>	He is self taught from observation.	He is self taught. He learnt secretly the different parts of design and making templates.	Work experience. His bosses would teach him how to design and make templates for clients.	Learnt technical drawing and has learnt to self train using other "masters" and the Internet.
<i>Information Technology. (Mobile phone, Computer)</i>	He uses mobile phone. He does not use computer.	He uses mobile phone and computer to communicate with his customers.	He uses mobile phone and landline telephone. He also had a Fax machine in his office.	He uses mobile phone. He uses computer to source materials such as fabric from Dubai, and to get new designs.
<i>Customer interaction</i>	Customers come to him from referrals. He charges "high" because of good quality.	He has constant contact with a few "big" customers. Most of his work is done away from the enterprise at the customers premises.	Most of the customers come to him and he does not follow them up.	He does not have any contact with the customers after the sale, although he gets more customers from referrals.

Source: Field data, 2010

6.2.8 Institutions' relationship with MSEs

The research established that the MSEs have a very weak linkage with institutions that are relevant to their growth in terms of product development. The research examined the roles of the Department of MSE (Ministry of Labour), Kenya Industrial Research and Development Institute (KIRDI), and Kenya Bureau of Standards (KEBS) and the School of The Arts and Design. The Department of MSE has no direct linkage with the Gikomba MSEs. It had a register of MSE societies from around the country. It participates in seminars that focus on MSE development. Lack of sufficient funding is a major impediment to its functions including the establishment of a resource centre. KIRDI undertakes research and development that is relevant to the MSEs that include simple technologies and machinery, ceramic *jikos* and honey production. However, it had not undertaken any research on the furniture making industry. The KEBS has no reports or standards for the furniture making industry in Kenya. It was established that the only furniture standards manual they had on sale was for European Standards. The process of establishing standards, they advised, was for the MSEs to form an association that would work closely with KEBS to develop the standards. KIPi, that protects innovations and intellectual property has had no interaction with the MSE furniture makers. The School of The Arts and Design, University of Nairobi, graduates an average of 15 interior designers annually. These graduates are absorbed by architectural firms and medium and large furniture hypermarkets. From these large shops they receive advice, mainly medium and high income clients on furniture and interior design. None of the graduates were found to work from Gikomba market. One of the Gikomba sofa-design entrepreneurs (see Appendix 1b - G1) stated that he gets some work from professional designers supplying them with interior furniture and fittings. Except for the one case mentioned here, the graduates do not interact directly with Gikomba entrepreneurs. The School has however, been engaged with Jua Kali in various product development exercises. For example, in collaboration with Terra Nuova (an international Italian based NGO), it successfully undertook product development with the Jua Kali in Nairobi improving and developing new products including a pre-sofa-bed set. In this collaboration staff of the School joined staff from Italy and worked with pre-selected Jua Kali with a view to improving their product quality and design in both Nairobi and Mozambique. The entrepreneurs who were involved in the exercise were able to produce quality products for the export market.

The Micro and Small Enterprise (MSE) Department of the Ministry of Labour is the coordinating department for information, publications and training for various MSE groups in the country. The Department has a library and resource centre and conducts periodic training. At the time of the research, they had not embarked on any training for the furniture makers. But the officer stated that they encouraged the Jua Kali to form societies through which they could request for specific training and the department would facilitate. Their resource centre was not functional because they lacked the man power to code and arrange the publications that they had acquired. The MSE department, although supposed to be the government point of contact with the MSEs is not part of the 4K initiative.

KIRDI undertakes research and development and develops training programmes for various MSE groups around the country. KIRDI also designs and manufactures simple machinery that help entrepreneurs in production for example of grain crushers, honey extractors, maize shellers and peanut butter making machinery. KIRDI has not undertaken research relevant to furniture makers. But, they expressed a desire to work with furniture makers for example, in identifying alternative materials to wood. One of the researches that was going on in 2010 was the commercializing of fish leather for use in making belts and shoes. KIPi registers innovations, provides training and safeguards ideas. Individuals are encouraged to register all inventions and innovations with KIPi. None of the furniture makers have registered any of their innovations. They stated that furniture makers can register original designs with them and also, any new material that they may invent. KEBS is the custodian of standards and quality in the country and it provides a seal of quality for certified products. KEBS is part of the 4K initiative along with KIRDI, KIPi and KNFJKA.

6.3 MSE Sofa Design Practice

The MSE sofa design practice as stated earlier is influenced by several factors. The four entrepreneurs are unique in that they combine several aspects of sofa design and are able to undertake the whole process within their enterprises. However increasingly, this is changing as other enterprises emerge to claim bits of the production process. A single sofa set presently can be produced by up to 6 mini enterprises as shown in Table 6-2. The success of a sofa set produced in Gikomba market can be attributed to any or all the six enterprises. The same can be said of the failure or fault in any sofa set produced.

Table 6- 2: Summary of mini-enterprises participating in sofa production

No.	Description	Role in sofa production
1.	Photographers	They sell photographs and pictures on the streets to the prospective customers. They can identify suitable entrepreneurs who can make the preferred sofa sets. They also sell cut outs from magazines to boost their folios. Most of the cut outs are from high end European magazines such as "Good Housekeeping."
2.	Carpenters	The carpenters are the "production managers" as they allocate duties to the various mini enterprises. The four entrepreneurs for example, work closely with carpenters in production of templates. They know the equipment, machineries and tools for production: Wood cutting lathe machines. Band saws. Hammers. Nails.
3.	Hammer and nail specialists. Joiners/finishers	Most of the sofa producers seen in furniture shops are "hammer and nail" entrepreneurs who purchase bits and pieces of sofa sets, mostly from Gikomba market. Their basic function is piecing together the bits and pieces of sofa that typically include the wooden frame, stuffing, upholstery and ornament. They sell the finished pieces to customers.
4.	Upholsterers	They engage in the production of the coverings for the sofa. Because they are aware of the popular sofa styles, the upholstery is often prepared in advance and the carpenters or joiners purchase them in sets according to their taste. For example, if you go to them and ask for the upholstery for "Buffalo" sofa, they will give you a range of upholsterers for you to select from. They have tailoring skills that allow them to cut out the upholstery. They also select fabric.
5.	Ornament makers	These are entrepreneurs who are specialized in design, cutting and painting of wooden pieces that are used in specific styles of sofa as ornament. There are others more specialized who engage in engraving of wood that is used especially for Swahili type of sofa. They also have a good knowledge of the popular sofa styles and will make the ornaments in advance for the "hammer and nail" entrepreneurs to purchase. They display their pieces on the ground along the street alongside the photographers and upholsterers.
6.	Waste collectors	There are waste collectors who use large sacks to collect the wood waste from the enterprises and at the points where the wood cutting machinery are operated. They also collect fabric waste from the upholsterers. The wood waste is sold to chicken and livestock farmers.

Source; Field data, 2010

Most of what are observed as sofa makers in Nairobi and around the country working in small enterprises belong to the category of "hammer and nail" entrepreneurs. They do not originate any designs. A few of them will qualify to belong to the group of carpenters based up on their technical expertise. The main difference here is that the typical "hammer and nail" entrepreneur is not able to design and make initial templates, but has the skill of joinery and finishing and therefore, will purchase sofa frames, the upholstery and the ornament from Gikomba market or other sources. He will then spend time at his enterprise, piecing together the sofa, selling and sometimes undertaking repairs. The entrepreneurs like G3 in Appendix 1b, hire "hammer and nail" entrepreneurs to piece together frames and pay them accordingly. Carpenters have better skills than the typical "hammer and nail" entrepreneur because they are able to make templates and also instruct the machine operators. Most apprentices work with carpenters.

6.3.1 Pricing and Management

Pricing for sofa sets takes into consideration the raw materials, labour, transport and profit margin. Sofa-design entrepreneur G2 explained to us that pricing is a two way process in which everyone needs to look at his or her interests in the sofa. It involves two people - the consumer and the entrepreneur. The consumer wants to save something on the *price*, and the entrepreneurs want a reasonable *profit*. Pricing can take one of three forms; *high price* for those who cherish value and uniqueness, the *fair price* that is charged to most customers (this is the customers preferred price), and "*special customer*" price (a price charged according to the individual customers' special needs). From this it can be seen that for the same sofa, there can be three different price tags depending on the above description.

Sofa-design entrepreneurs had multiple retail outlets, furthermore, they were under pressure to vacate the present site, yet they were adamant that they preferred to stay in Gikomba market. It may be noted that their present site has periodic fire outbreaks leading to major losses for the traders (see Appendix IX). Competition is very stiff in Gikomba market but that has not deterred the entrepreneurs. Competition comes from other sofa makers, from inferior sofa makers who operate in the vicinity, from the various marketing agents who identify customers for them and expect commission for each transaction. The sofa-design entrepreneurs do not fear competition from the medium and larger sofa manufacturers because they believe they will continue to have

more customers coming to them. Asked whether they would choose any other area other than Gikomba market for their business, the entrepreneurs stated that Gikomba market was the place of choice. It was convenient and had all the raw materials, and a ready customer base.

6.3.2 Mini enterprises involved in sofa production

When a customer walks into the main street in Gikomba market, he or she will be met by photographers who display sofa photographs on make-shift tables on the streets. These vendors have expanded their offering from photographs to include magazine cut outs. Each photograph or picture retails at Kshs 20. The photographers will typically offer to introduce the customers to the entrepreneurs who can manufacture the sofas they prefer after purchase of the photographs.

The entrepreneur will meet the customer and if the design is not one that is already in production, he shall proceed into the design process that is discussed later. If however it is a design that has been produced then the carpenter will use the templates to instruct the machinists on what design to cut and any alterations required. From the machinists, the pieces will go to the "hammer and nail" group to piece it together. The upholsterers will provide the upholstery and the ornament makers will provide the ornaments for the finish. The hammer and nail group are also charged with finishing. Table 6-2 outlines the mini enterprises functions. The sofa-design entrepreneurs often take the role of the carpenter in the process but if the work is overwhelming, he will hire carpenters who are readily available at Gikomba market, to undertake the duties (Appendix 1b-G3). The waste collectors are very important to the sofa making industry because they ensure that the wood waste does not build up. They work closely with the machinists. The wood waste is sold to livestock farmers.

6.3.3 Wood and other Raw Materials

Wood available in Gikomba market includes cypress and camphor that are now found to be too expensive. *Mukima (Grevillea Robusta)* is the more preferred wood for sofa frames. Other woods that can be found are pine, blue gum and *Mavuli*. Most of this local wood used to be sourced from the Rift Valley however it has become very difficult for the traders to get timber locally. The entrepreneurs source premium wood such as mahogany from Industrial area in Nairobi which in turn is brought into Kenya by large trucks that ferry goods to DRC.

6.3.4 Tools and equipment

The sofa-design entrepreneurs own some equipment such as Lathe machines, Band Saws, Circular Saws (see Chapter 5 for examples) most of which are fabricated within the market. The machinery in Gikomba is said to be one third (1/3) the cost of imported machinery and the entrepreneurs are satisfied with their output. Most of the machines are not calibrated as seen in Figure 6-1. Calibrated machines like the wood drilling machine in Figure 6-2 from entrepreneur G1 is said to be too expensive for most entrepreneurs. The types and uses of equipment is discussed more elaborately as part of the production process.

The machinery and equipment used in sofa making are made in Gikomba market by local engineers. This also applies to most of the tools. Everything the entrepreneurs need for production is available in the market such as the electric wood cutting machine in Figure 6-1. Many of these machines are dual owned and there will be only or two machinists assigned to each machine.

Figure 6- 1: Common electric wood-shaping machine



Source: Field data, 2009

Sofa-design entrepreneur G1, who invests in quality sofa has some imported machinery like the wood drilling machine seen in Figure 6-2. The calibration can be seen on the meted ruler that is set and locked. This ensures that the drilling point is standardized and consistent. This machine was imported from Italy.

Figure 6- 2: A calibrated wood drilling machine



Source: Field data 2011

The calibrated machines cost as much as three times of the Gikomba machines and therefore the MSE prefer the Gikomba machines. In the literature provided earlier, it was seen how the provision of imported heavy duty machinery contributed substantially to the improved furniture products in Migori, Kenya. calibration is a major factor in standardization.

Table 6- 3: Summary of MSE sofa-design practice

Variable	G1.	G2	G3	G4
<i>Tools and Equipment</i>	He has a Lathe, Band saw, Circular saw and the small woodworking tools.	Co-owns one Lathe machine and other hand/simple tools.	He uses the lathe machine and equipment around. He owns simple tools for woodwork.	He has a Lathe, Band saw and other woodworking tools.
<i>Reasons for bad sofa.</i>	Some artisans use poor stuffing or padding. Poor quality of wood. Lack of proper training -drop outs from apprenticeship.	Artisans drop out from apprenticeship. Rush to make quick money.	Artisans rush to make quick money. Lack of proper training. Poverty -need to care for siblings and family.	Lack of the right machinery and use sub-standard machinery or other hand tools.
<i>Critical considerations in sofa production.</i>	Quality Choice of wood. Choice of fabric. His prices are higher because he cares about the quality.	Quality depends up on price the customers are willing to pay. Pricing - he has learnt the art of pricing that the customers are comfortable with.	Finishing that largely depends up on what the customer can afford.	He said, "There are no incentives to make us produce good sofa."
<i>Dimensions and standards</i>	He uses European dimensions that he was taught in apprentice with Asians.	He uses dimensions that he learnt during apprenticeship. He can estimate from experience.	"We set our own standards and dimensions. We can make equal or even better quality than the imported furniture," Entrepreneur G3.	He knows the dimensions from apprenticeship and also from training.
<i>Other important observations</i>		He cannot venture into supplying large scale furniture e.g government. He has a trained "eye" to see the "good" quality fabric.	The site of operations is under development and they risk eviction.	Government needs to come up with continuous training programmes for Jua kali. Intense competition from each other thus necessitating taking "short cuts" especially in use of sub standard materials.

Source: Field data, 2010

6.3.5 Reasons for bad sofa

From observation it was evident that many of the MSE entrepreneurs including the sofa-design entrepreneurs made bad sofa and the question was put to them why Gikomba market entrepreneurs sometimes produce bad sofa. To qualify this statement the research sought to establish the key features. From the sofa-design entrepreneur G4, for example there was a seven seater sofa set upholstered with blue velvet that had been rejected by a customer. The entrepreneur stated that it was due to a misunderstanding. There was also a high-end ornamented sitting chair that had a white leather back rest that had been rejected because of poor workmanship. Entrepreneur G3 had a reclining single sofa seat from a leading furniture store that had been rejected by the store because of poor workmanship too which he stated that he was in the process of correcting.

The ODM sofa style in Figure 6-3 exhibits the typical flaw. The flaw in the sofa construction is obvious from the crooked stuffing. The ODM was one of the popular sofas preferred by customers and it retails for Kshs 25,000 for a five-seater medium size. The popularity can be attributed to its politically derived name. The relationship with politics was attributed to it being the "newest" sofa during the initial wave of ODM politics in Kenya (from 2007). The seat has two loose cushions and a headpiece that has two "ears" protruding at the ends. It can be seen that the sofa is not very symmetrical. This could be due to upholstery, inappropriate stuffing and/or finishing or negligence. When entrepreneur G3 was asked why he engaged in producing faulty sofa when he is aware of the faults, he stated that customers do not want to pay for "quality" (see Table 6-2 and Appendix 1b - G3) while G4 stated that there are not enough incentives for quality production. Entrepreneur G2 will produce quality according to the price the customer is comfortable with. Entrepreneur G1 will not produce faulty sofa because he charges higher and produces good quality. From this it can be deduced that 1 out of 3 of the entrepreneurs will produce good quality sofa.

Stuffing can also cause the sofa to be "bad" as shown in Figure 6-3 and Figure 6-4. The picture of the waste fabric stuffing was taken outside the four enterprises that were the focus of this study, primarily because during the period of fieldwork, we did not come across the entrepreneurs

undertaking this process. However, it was taken in Gikomba market and it illustrates the extent to which the entrepreneurs will go to save on costs at the expense of proper production practice.

Figure 6- 3: ODM style single seat sofa



Source: Field data, 2010

On further interrogation the entrepreneurs stated that sometimes their colleagues may be driven to produce bad sofa due to the use of poor quality wood (like the insect infested *Gutheria*), lack of proper skills, a rush to make quick money, lack of proper machinery and poverty (see Table 6-2). Other aspects that can contribute to bad sofa could be attributed to equipment and tools and these are discussed later under production processes.

From observation one can also conclude that a sofa is flawed from the ability of the user to sit and stand from it comfortably. For example, observation of an elderly customer (estimated at 60 years of age) trying to lift herself off a sofa in one of the showrooms in Gikomba market demonstrates the difficulty created from improper dimensions. The lady was a prospective customer seeking out an appropriate sofa and her attempt to sit and stand up from this particular one was challenging. We did not interrogate her further, but made the observation and allowed her to try other sofa sets that were on display. This difficulty can be attributed to a lack of consideration to popliteal height and buttock and hip length that NASA has developed for the United States sofa makers (see Chapter 3-3.8).

Figure 6- 4: waste fabric being used in stuffing sofa



Source: Field data, 2009

An observation of the sitting angle of the man on the right picture Figure 6-4 demonstrates the same thing. Assuming the man's buttocks are well angled on the seat corner, he can be seen leaning precariously to the extent that his left hand is resting on the mid section of the sofa. This shows that the bottom half of the sofa back rest angle is faulty and prolonged sitting can cause back injury.

6.3.6 Sustainability considerations

The level of awareness of design trends including sustainability was investigated and most of the sofa-design entrepreneurs were not too concerned about the environment and use of energy. However, entrepreneur G1 proved most concerned about sustainability. He stated that no wood is wasted and he uses every bit including the waste in production. He cures his wood properly and he is aware of the need for alternative materials because wood is becoming scarce.

The entrepreneurs can be said to be user centered in the sofa design in so far as the price, finishing and style are dependent up on him or her. Entrepreneur G3 would like to make better quality sofa but his customers are not willing to pay that little extra (Table 6-2).

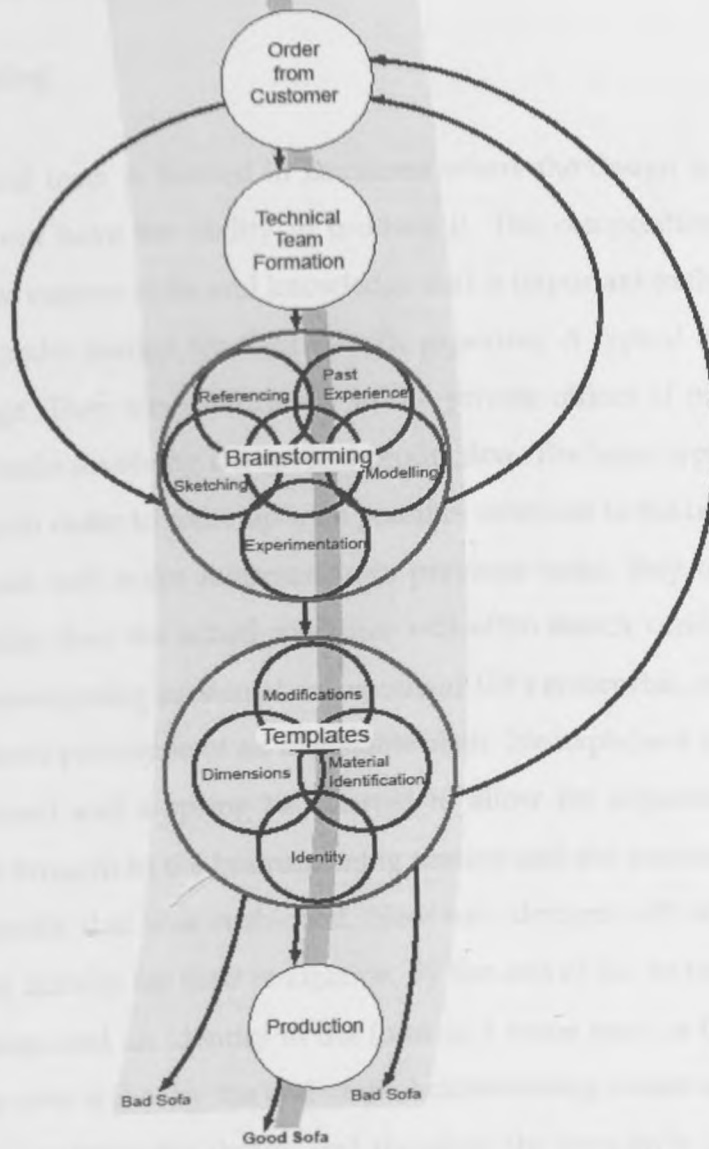
Design principles in MSE sofas can be seen in the fact that they attempt to develop standards according to their experience and training (user centered design) (Table 6-2). The consideration of

material, style and finishing is also dependent upon the customer and this can be associated with application of social design principle. The entrepreneurs continue to use wood even though they are aware of eco design concerns of the need to conserve the natural and irreplaceable resources. When asked his views on how to get the entrepreneurs to be more efficient in production and reduce wastage on wood, one entrepreneur said, "awareness creation on the impact of the waste would also cause the entrepreneurs to waste less" (Appendix II -G2). It was shown earlier that experienced designers put emphasis on quality. In the case of the entrepreneurs, they can produce quality, but this is dependent on the customer. And, typically, the customer opts for cheaper rather than quality because it is more expensive. Sofa-design entrepreneur G2 states that quality is a strong motivator for repeat customers at his enterprise (see Appendix II - G2). There is evident inconsistency in the considerations of factors relating to design practice with each entrepreneur having his own approaches and priorities.

6.4 MSE Sofa Design Process

The information provided coupled with observation of sofa-design entrepreneurs' brainstorming sessions (see Appendix II) and focus group discussions leads to a conclusion that the entrepreneurs engage in sofa design process that is result oriented but not consistent. In the MSE sofa design process the phases cannot be clearly outlined. However an attempt has been made in Figure 6-5 that is constructed from discussions, interviews and observation. The steps outlined are developed from multiple sources of information including narrations, observations and informal interviews held with various persons. The MSE sofa design is initiated by orders from customers who go to the enterprises, sometimes they are referred by photographers who sell design ideas in the form of pictures to them. With the photograph of the preferred style, the customer approaches the entrepreneur. Sometimes the entrepreneurs accompany the customer to supermarkets and other furniture outlets to see the customers' preferences. All the entrepreneurs have photographic albums of their sofas from which customers can also make a choice. The photograph of the sofa style is used to negotiate price and identify preferred materials and finishes.

Figure 6- 5: Illustration of MSE sofa design process



Source: Field data, 2010

6.4.1 Idea generation

Idea generation for sofa is initiated by customers who come to the enterprises to request for sofas. The customers may interact with photographers who sell to them pictures of sofa. These pictures form the basis of their discussions with the sofa-design entrepreneurs. The sofa-design entrepreneurs also have picture albums which they can use for reference purposes. The other method is whereby, the customer takes the entrepreneur to the furniture shop or supermarket and

he looks at the sofa critically. He then reconstructs the sofa from memory at his workshop and proceeds to replicate it (see Appendix 1b - G3). This entrepreneur has developed a sofa named "Nakumatt" based up on the source of the idea.

6.4.2 Brainstorming

An informal technical team is formed in situations where the design is new and the sofa-design entrepreneur does not have the ability to produce it. The composition of the technical team is colleagues who have various skills and knowledge that is important to the task. Team members are well known in Gikomba market for their specific expertise. A typical team will be made up of 4 members on average. They meet informally in the private offices of one of the entrepreneurs to undertake specific tasks involving design and production. The team typically brainstorms and can sit up to three times in order to come up with possible solutions to the task. Depending on the task, members of the team will make reference from previous tasks, they may make models that are proportionally smaller than the actual sofa; they will often sketch various parts of the sofa. When we witnessed a brainstorming session at entrepreneur G3's enterprise, one member of the technical team brought a pieced prototype of an adjustable chair. He explained to the others how the metal pieces could be joined and a spring be inserted to allow for adjustment. At another session, a reclining chair was brought to the brainstorming session and the members were discussing how to repair a broken handle that was cushioned. New sofa designs will often undergo this technical team brainstorming activity for their realization. By the end of the technical team sessions, the sofa will have taken shape and an identity in the form of a name such as ODM, Lucy, Buffalo or Aga Khan. The point to note is that by the end of the brainstorming sessions, each of the technical team members is able to replicate the design and therefore the new style is quickly replicated. In the context of empirical literature presented, there is a level of codifying of information that happens at this stage in the design.

6.4.3 Development of "kingi" templates

In most carpenters workshops, templates or "kingi" (as they refer to them), are hung on walls or roof. Typically these are templates cut from plywood which represent the various parts of the sofa. The "hammer and nail" entrepreneurs do not have templates because they purchase the semi finished sofa pieces, but the carpenters have to have the templates to facilitate replication. The templates are referred to as "kingi." Kingis are accurately cut out of plywood and are stored at the

roof or walls of the enterprise (see Appendix VII b). Sofa dimensions are determined by the templates and therefore they are a very important part in the production process.

In the case of a challenging sofa design, the entrepreneurs may start with the small sofa (single seat) and ask the customer to come and ascertain that they have achieved the design according to his/her wishes, before proceeding with the other pieces. With the templates in place, the entrepreneur can adjust measurements to develop other versions and designs. Sofa anthropometrics therefore are metered from the templates.

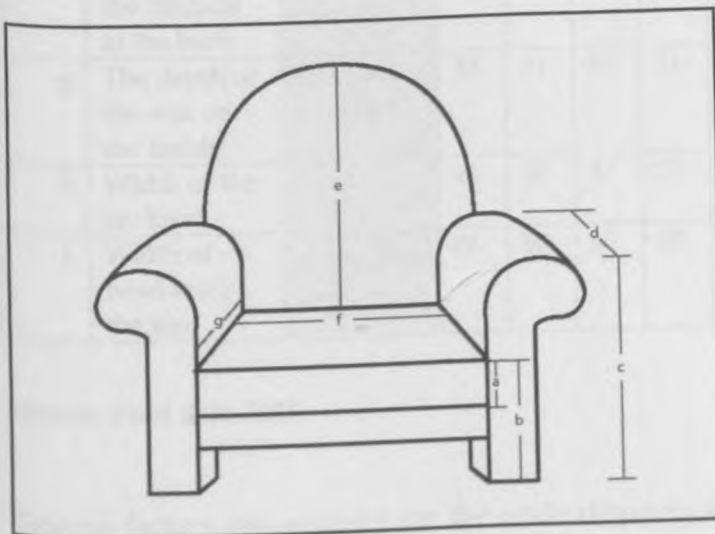
6.4.4 MSE Sofa Anthropometrics and Dimensions

The application of templates to the sofa frame and final design was investigated by taking anthropometric measurements. Sofa-design entrepreneurs G1 and G2 were trained by European and Asian masters. The European training was more comprehensive, while the Asian training focused on making the entrepreneurs specialists in little units within the production process as opposed to the total process as explained earlier. As a result, entrepreneur G1 uses European dimensions, G2 uses the dimensions he learnt from apprenticeship, G3 sets his own standards and G4 uses dimensions he learnt from formal training (Table 6-2). The entrepreneurs have diversified the sizing of sofa in response to customer needs. They have sofa in small, medium and large sizes. So, a customer may opt for ODM style, but small fit or size or, they may choose a medium or large fit.

"We set our own standards and dimensions. We can make equal or even better quality than the imported furniture." This statement by entrepreneur G3 (see Appendix Ib) underscores the standardization of sofa dimensions within most the MSEs. The quality and dimensions of sofas vary from one entrepreneur to another. Even the names of similar sofas vary from one entrepreneur to another. The quality of raw materials including wood, fabric, and stuffing varies. For cushions, there is soft, medium and "super" cushions that vary according to density of foam. They do not have specific standards catalogues. As a result for example, a sofa such as the popular ODM style, the dimensions, cushion covers and sizes can differ considerably from one enterprise to another. Figure 6-3 underscores this point.

MSE sofa anthropometrics were undertaken to establish the dimensions of the MSE sofa. Taking measurements from the same sofa was challenging because even from the same seat such as the "Jumbo", there are alterations that result in three sizes with very little difference in measurement. For example, there is standard jumbo, wide Jumbo and large Jumbo. Jumbo measurements J1, J2, J3 and J4 in Table 6-3 were taken from the entrepreneurs G1, G2, G3, G4 respectively. A random measurement was taken of 3 sofas with similar features at a market outlet within Gikomba and these are presented as C1, C2 and C3. A second random sample of 3 sofas was also undertaken by customers who were identified within the University of Nairobi and these are presented as C4, C5 and C6 in Table 6-3. Figure 6-6 was the standard template that was used to assess the anthropometric measurements. The results are presented in Table 6-3. Standard measurements given in the last column of Table 6-3 was obtained from the focus group discussions that were held with the entrepreneurs.

Figure 6- 6: Outline of sofa anthropometrics



Source: Field data, 2010

Although there seems to be some standard measurements, some of them seem very disparate. The cushions come in standard sizes and therefore cannot be a contributing factor to the faulty measurement of "g", "f" and "h" in Figure 6-6. There can be a few explanations for the other discrepancies, it could be that the measurements were faulty especially those that were taken by the users themselves; for those that were taken at Gikomba Market factors such as fabric and finishing could cause the fault in measurement; it could also be that the entrepreneurs are not keen when cutting and piecing together the sofa. Based upon the measurements especially the fact that during the focus group discussions, the entrepreneurs were able to give some standard

measurements that are reflected in the column "Stan.", then it may be possible to develop certain specific measurement for each sofa style that is made by the MSEs.

Table 6- 4: MSE sofa anthropometric measurements

No.	Description	American Standards	Measurements in centimeters										
			J1	J2	J3	J4	C1	C2	C3	C4	C5	C6	Stand.
a.	Loose Cushion		15	10	10	10	10	15	11	10	10	11	10
b.	The height of the seat.	43 cms	38	42	40	38	37	47	45	51	40	45	40
c.	The height of the armrest.		64	57	65	61	61	58	61	62	61	64	65
d.	The length of the armrest.		76	85	76	58	65	67	51	92	65	67	75
e.	The height of the backrest.		84	65	56	58	45	50	54	44	50	58	63
f.	The width of the cushion at the back.		56	41	56	53	47	50	59	66	50	56	51
g.	The depth of the seat on the inside.	40 cms average	33	51	50	51	22	50	50	54	56	51	51
h.	Width of the backrest.		61	50	51	53	55	50	59	103	50	56	51
i.	Width of head rest at the top.		86	50	60	58	98	80	111	103	98	80	58

Source: Field data, 2010

Several factors can account for the wide disparity in measurements. Sofas are developed around three sizes for each style. For example, it was established that ODM style may come in small, medium or large sizes. It also has a wide version. However, when all these variations were presented to the MSEs they reached a consensus that is reflected in the last column "Stand."

6.5 MSE Sofa Production

Sofa production commences after the initial design process in which prototypes or *kingis* are prepared (Figure 6-1). Manufacturing entails identifying the wood according to what is agreed with the customer, cutting and shaping the wood, identifying the materials needed such as

stuffing, upholstery and ornament (if it is part of the design). Upholstering and ornamenting where necessary. The equipment and machinery is also identified especially if the design requires special technical input.

1. **Framing:** The framing is an important aspect of the sofa that includes selection of appropriate wood (as agreed by the customer), cutting and joining the pieces as shown in Figure 6-7. The preferred wood is *mvuli*, and the best available wood is mahogany. Most of the wood is readily available from the wood merchants in Gikomba market although the prices have increased dramatically over the past four years. The worst wood is *Mukima* and *Githeria* which are typically ant -infested, causing the sofa to decay and disintegrate within a year of manufacture. As a result the sofas made from this wood, although cheap in price, may collapse within one year of purchase.

Figure 6- 7: Artisans working on sofa frames



Source: Field data, 2009

Sometimes the artisans make frames from wet wood, wood that has not cured or dried. Their reason for doing this is that the wet wood holds the nails better and prevents the

wood cracking. Furthermore, they argue that as the wood dries, the nails rust and hold the joints firmly in place.

Figure 6- 8: Joinery and finishing of sofas



Source: Field data, 2009

2. **Stuffing and covering:** The preferred material for stuffing of the sofas is sisal fibre that is layered and covered with thin foam as shown in Figure 6-8. Foam chips are an alternative for stuffing although they are more expensive. A thin layer of foam is then used to cover the stuffing to hold it in place. When the stuffing is not undertaken properly then the sofa will end up deformed or will collapse shortly after purchase. Inappropriate stuffing can be seen in Figure 6-5.

The importance of stuffing to the sofa is that it gives form and shape. Krohler, one of the leading sofa makers in the United States (www.Krohlerfurniture.com) prides themselves with firm sofas that “spring” back to shape when you wake up. When the stuffing is not well laid, the sofa immediately loses form, shape and its’ symmetry. A close examination of the ODM sofa in Figure 6-3 illustrates this point. The top cushion, for example, has lost symmetry therefore the sofa looks asymmetrical. Another issue that may arise is from waste fabric used as stuffing by some unscrupulous artisans as shown in Figure 6-4. Covering or

upholstering is done by nailing and stitching the top cover fabric on to the frame. The choice of fabric, trimmings and ornament are the final touches on the sofa. Entrepreneur G2 stated that it takes a trained eye to differentiate quality fabric because cheaper copies are made readily available.

The unscrupulous artisans use any available waste material for stuffing including fabric, discarded hair extensions, wood waste and plastics. The irony is that the seat when covered as can be seen on the right looks as good as any other. The customers are further attracted to buy the seat because they are normally charged cheaper than their counter parts. This sofa set of three pieces sells for Kshs 15,000 against a price of Kshs 25,000 for a better one from one of the entrepreneurs.

3. Upholstery: Most of the sofa upholsterers work in the open spaces outside shops that sell furnishing fabric. They work alongside button makers and ornament makers (see Figure 6-9). They sometimes make the upholstery without prior order according to the sofa type so that when the sofa maker comes he does not have to wait for the upholstery.

Figure 6-9: An upholsterer working in the muddy streets of Gikomba



Source: Field data, 2009

For example, they are familiar with styles such as ODM (Figure 6-3) they are able to make the seat and cushion covers and display them. The customer or the entrepreneurs can then purchase them thus saving on time. Ornaments mostly consist of wooden pieces that are painted or inscribed with motifs that are added to the sofas.

The upholsterers make available all types of seat covers from various materials most of which is readily available in Gikomba market. Their skill levels in upholstery impacts on how well they fit on the sofas. It may be said here that all the upholstery in Gikomba market is done by women. And that it is the only sofa making activity undertaken by women. If the upholstery is not well done, there will be loose fabric hanging on the edges and some parts of it will be too tight. The problem exhibited in Figure 6-3 of the asymmetry could be attributed to upholstery, especially with the headrest.

6.6 *Administration Role in Sofa Production*

The role of local administration was established through informal interviews with the officers. The District Officer stated that she was not involved directly with the sofa makers although she was aware of their activities. She was not aware of their associations and had not hosted them in her three years stay in Gikomba. We probed on whether she was aware of the issue of conflicts between the City Council and the entrepreneurs over the site the entrepreneurs occupy. It had not been brought to her notice and she was not involved as at the time of the research. The City Council is very active in Gikomba market in collection of council dues. This is evident by their constant presence everyday at the market. The street hawkers including the sofa photograph sellers pay a daily rate. At the time the research field work was started, the City Council officers gave us the original number of sofa enterprises according to their records of tax collection. In the later parts of field work, it became increasingly difficult to establish exactly how many enterprises were operating at the site, and as a result the officers devised a method of collecting tax on machinery, enterprises and hawkers. They are very strict in their collection and therefore engage in periodic running battles with the operators. The Chief had more interaction with the sofa entrepreneurs. He has periodic reports from disagreements arising from sofa customers and entrepreneurs. Sometimes these complaints are recorded in an exercise book, but most of the time he dispenses with them and they go away. We were interested in probing the type and frequency of such

complaints. Table 6-5 shows a summary of the complaints as described by the chief and reported in his exercise book.

Table 6- 5: Complaints and issues from the Chief's records

No.	Complainant	Complaint	Remarks
1.	Customer	The entrepreneur sold off their sofa to another customer.	The entrepreneur was asked to make another sofa to replace the sold one within 7 days.
2.	Customer (this is the most common complaint).	The entrepreneur did not use the agreed wood or material. He chose a cheaper wood and material. Sometimes the sofa is stripped to reveal the wood/frame underneath.	The entrepreneur is ordered to pay for the spoilt sofa and to make the one agreed upon in a given period of time.
3.	Customer	The sofa is not finished on the agreed day.	The entrepreneur is ordered to make the sofa by a given time.
4.	Customer	The agreed design/style is not what the entrepreneur makes.	The entrepreneur is ordered to refund the customers money.
5.	Customer	Use of bad stuffing - wet fibres for stuffing the sofa cushions.	The customer is refunded her money.
6.	Customer	Use of wet wood which made the sofa to disfigure when the wood dried. The sofa also began to have a pungent smell.	The entrepreneur was asked to refund the money.
7.	Customer	The sofa is weak and has fallen apart shortly after purchase.	The entrepreneur is ordered to repair within an agreed time.

Source: Field data, 2010.

Most of the complaints are reported by customers dissatisfied by the service they have been given by entrepreneurs. The customers' complaints include the entrepreneurs not adhering to the set standards in terms of material, finishing and styles. Sometimes, the customer will pay for mahogany wood that is expensive, and the entrepreneur will use a cheaper wood, knowingly. The customers feel that the entrepreneurs do not value them and do not pay attention to them. Often the entrepreneurs try to cut costs further to increase their profits even after convincing the customer that he will use "good" material. This factor is corroborated by complaints received by the area Chief from dissatisfied customers.

The complaints recorded show that although the customer selects the design, the entrepreneur sometimes is not able to meet the customers' needs. The use of wrong wood knowingly, poor or

inappropriate stuffing and poor finishing points at unethical practice by entrepreneurs. What is not known is whether appropriate training through apprenticeship can reduce or eradicate this malpractice. The chief in the case above is evidence of some regulatory process in which bad practice is punished. However, because of liberalization the sofa industry needs to have a strong society that can regulate the industry and also lobby government. Self regulation is good because it institutionalizes the conduct in the industry. Self regulation is advocated in the new constitution and if implemented can be beneficial to the entrepreneurs, while also assuring the customers of quality products.

6.7 Summary

The MSE sofa design process was the first objective of the research and in answer to the first research question it can be said that the MSE sofa design process is a five-phase process that can best be described as a trial and error process. The sofa-design entrepreneurs depend on experience, brainstorming in technical teams and development of templates to produce prototypes. In the manufacturing process, the sofa-design entrepreneurs use simple tools and equipment. Most of the equipment such as lathe machines is fabricated within Gikomba market by engineers. The anthropometrics/dimensions and measurements of the sofa are not standardized with some entrepreneurs admitting that they establish their own dimensions. The entrepreneurs manufacture sofas in three sizes namely small, medium and large. In the production process, it is observed that the MSE sofa frames sometimes is made from wet wood, is stuffed using waste material that deform the sofa, and covered with cheap fabric that is not durable. The wet wood sometimes leads to the sofa splitting as it dries; the use of inappropriate upholstery leads to accelerated wear and tear; the use of inappropriate stuffing leads to deformation of the sofa. Most of the MSE sofa entrepreneurs do not consider any of the design principles such as sustainability or eco design except one of them. Their raw material comes from Industrial area within Nairobi.

Although there is increase in numbers of customers for MSE sofas, a few complaints were traced from the administrative offices from both the customers and entrepreneurs. This includes use of wood and finishing that was not agreed upon between customer and entrepreneur. There is also bad business practice in which entrepreneurs sell off customers' sofas to other customers.

7.0 SKILL ACQUISITION WITHIN THE MSE SECTOR

7.1 *Overview*

One of the main objectives of this research was to establish how MSE entrepreneurs acquire the knowledge and skills for sofa design. This chapter is therefore dedicated to discussing the knowledge and skill acquisition methods for MSEs. In the previous chapter it was established that the entrepreneurs depend on apprenticeship, Internet and self training to get the design skills necessary for sofa design. Earlier it was established that all the four entrepreneurs except one were trained by Asian and European masters working in medium and large furniture shops. These entrepreneurs are trainers of others. However, there are other trainers including carpenters, machinists, and ornament makers. From this it can be concluded that there are many trainers apart from the four entrepreneurs. The apprentices that were interviewed were ten and they were taken from the four entrepreneurs. The four enterprises had an average of 3 apprentices working in various sections of production. This chapter explores the reasons why apprentices prefer Gikomba apprenticeship; its content; period and benefits among other things. The reaction of professional designers to the Gikomba apprenticeship is discussed and from the findings a design extension Services model is proposed and discussed.

7.2 *Apprentices at Gikomba Market*

Ten apprentices were interviewed for this research. This number was found to be sufficient to compliment information gathered from the four entrepreneurs. It is difficult to estimate the actual number of apprentices working in the sofa industry in Gikomba, because first, the stage from apprentice to employee is not clear, second, the carpenters and their apprentices are often sub contracted and not employees of the entrepreneurs. The sample of ten was found at three of the four enterprises working on sofas with various carpenters. They were identified through the entrepreneurs. The apprentices typically select the type of training they want to undertake and the content or depth of the training. They may be charged a small fee but most of them train for free and after a short period of about two months, they begin to earn some money from the trainers.

When a prospective apprentice arrives in Gikomba market he approaches a trainer, depending on what skills he wants to train in. The trainers give an informal interview that typically assesses the apprentices' character and his ability to train. The entrepreneurs place great importance to the character of the apprentice. It may be noted that sofa-design entrepreneur G1 (Appendix 1b) was not having any apprentices because he was concerned that they waste material, it takes too much time and effort to train the apprentices and the apprentices are a little young (sometimes as young as 14 years). Table 7-1 provides an overview of apprenticeship in Gikomba market.

Table 7- 1: Outline of apprenticeship in Gikomba market

Variable	G1	G2	G3	G4
<i>Number of apprentices</i>	None.	3 apprentices.	3 apprentices.	3 and 1 on attachment from CITC Pumwani.
<i>Fee paid by trainees</i>	None	None	None- they do not pay. However, he pays them between Kshs 100 and Kshs 300.	They do not pay. They are paid something small for bus fare and upkeep.
<i>Training Content</i>	None - he has not taken any apprentices this year.	Joinery and cutting. Machine operations.	Joinery and cutting wood. Machine operations- buying materials. Customer relations.	The apprentices work with the trained carpenters/artisans doing "everything."
<i>Issues/ observations</i>	Training apprentices is expensive -time, wastage in material and sometimes theft.	Need to intensify apprenticeship training to avoid artisans producing "bad" sofa.	He wants the government to recognize them as "good" trainers and give them an opportunity to develop courses and train apprentices.	He has experience and knows he can train more apprentices with a better structure.

Source: Field data, 2010

After a short period of time of about two months, apprentices begin to earn a little money from the trainers (between Kshs 100 and 300 per day). Table 7-1 is a summary of apprenticeship, content, cost and some issues reported from the four entrepreneurs. It can be seen that the apprenticeship training covers the day-to-day activities within the enterprises, focusing on technical skills of

joinery and cutting and simple business skills. Design and related skills of creativity and draughtsman ship are not mentioned specifically.

7.2.1 Districts of Origin

Apprentices from Gikomba market come from all over the country. However, most of those interviewed came from eastern province with Kathiani and Masii sharing 40% of the apprentices as shown Table 7-2. It can be concluded that most apprentices are from the Kamba and Luo tribes of Kenya.

Table 7- 2: Apprentices' districts of origin

No.	Home District	Respondents	Percentage (%)
1.	Changamwe	1	10
2.	Kathiani	2	20
3.	Masii	2	20
4.	Tala	1	10
5.	Machakos	1	10
6.	Nyakach	1	10
7.	Ahero	1	10
8.	Bahati	1	10
TOTAL		10	100

Source: Field data, 2010

7.2.2 Period of stay in Gikomba Market

The apprentices had spent between four months and two and half years in Gikomba market as shown in Table 7-3. Most of them begin to earn some money after two months of informal apprenticeship. The ones who have stayed longer, for example two years are looking at perfecting "all-round" skills. This implies that they undergo various stages moving from one specialty to another. Because of the fragmented nature of the sofa making activities, there is no one-stop point at which apprentices will acquire all the skills at once.

Table 7- 3: Period of stay in Gikomba market.

No.	Period in Gikomba	Number of respondents
1.	4 months	2
2.	7 months	1
3.	9 months	2
4.	1 year	1
5.	1 ½ years	1
6.	2 years	1
7.	2 ½ years	1
Total		10

Source: Field data, 2010

The apprentices have been at Gikomba market for an average period of 1 year 1 month with the longest stay at 2 ½ years. The shortest stay is at 4 months. It can be assumed that at 2 ½ years, the apprentice has learnt more skills and he is probably making enough money to survive. It is noted that after about 6 months of training, the apprentices begin to get some income for their labour.

7.2.3 Highest Level of Formal Education

Most of the apprentices have secondary school level of formal education. The lowest is Class 7 primary school while the highest is Form 4 as recorded in Table 7-4. The apprentices stated that they were driven to Gikomba market because of lack of school fees while some were looking for a cheap way to acquire knowledge and skills that would enable them start their own enterprises. The age range of the apprentices was not investigated, however, it was noted that the age of entrants into apprenticeship was getting younger and younger presently they get apprentices as young as 14 years (see Appendix 1b - G2).

Table 7- 4: Highest level of formal education.

No.	Highest level of education	No. of respondents	Percentage (%)
1.	Form 4	1	10
2.	Form 3	2	20
3.	Form 2	3	30
4.	Class 8	2	20
5.	Class 7	2	20
Total		10	100

Source: Field data, 2010

None of the apprentices wanted to continue with school after starting apprenticeship if an opportunity arose. They were happy to gain skills and to get some income from their labour.

7.2.4 Reasons for Joining the Sofa Industry

Opportunity for self employment seems to be the strongest motivation for the apprentices, while others see it as an opportunity to get some income in the future and a few apprentices want to become experts and teach others. Table 7-5 shows an outline of the reasons and responses.

Table 7- 5: Reasons for selecting to learn sofa making.

No.	Reasons for choice of trade	Respondents	Percentage (%)
1.	Opportunity for self employment	7	41
2.	Opportunity to learn and become a teacher for others.	2	12
3.	Opportunity to get some income	3	18
4.	To become an expert and learn so many things at the same time	2	12
5.	He can learn without paying anything	1	6
6.	No education to pursue other careers	1	6
7.	To develop a big industry that can export products outside the country.	1	6
Total		17	100

NB. The *n* is 17 that is greater than the number of respondents (10) because the apprentices identified multiple reasons for choosing sofa making.

Source: Field data, 2010

It can be concluded that apprentices such as the one who has been on training for two years, sees an opportunity for him to be a trainer. Other apprentices have no money to pay for training and therefore would rather engage in an activity in which they are paid. Looking back at the four entrepreneurs and their reasons for entering sofa making, poverty and social responsibilities and this situation may be the same for the apprentices. From Table 7-5 also, it may be noted that the need for income is much higher than the need for getting expertise in sofa making.

7.2.5 Intended Period of Apprenticeship

The apprentices intended to stay for periods ranging from indefinite to "no more." Some felt they had learnt enough while others were happy to continue their apprenticeship. Table 7-6 shows the intended period of stay as apprentices. This is interesting because it was established that there is no set limit for apprenticeship so the period depends up on the apprentice himself. Most of the apprentices (60%) stated that they want to stay long enough to be able to produce a "good" sofa. This is a relative description but at least it forms a basis for us to conclude that it is a period between 3 months and probably not more that 2 years.

Table 7- 6: Intended length of stay in Gikomba market.

No.	Respondents	Number of Years	Percentage (%)
1.	2	3 months	20
2.	2	No more, I have learnt enough	20
3.	6	Until I can produce a good sofa	60
Total	10		100

Source: Field data, 2010

The period of stay in Gikomba market is flexible and the trainees are not pressed to graduate out of apprenticeship. As seen earlier (Table 7-3), for apprentices who intended to stay training for 3 months, they had already over stayed their expected time by one month because they were going into four months of training. The entrepreneurs or trainers when asked how long apprenticeship period should be two of them stated that a minimum of six months (Appendix 1b- G2) , another said it should be two years and the fourth said from three months minimum depending on content and trainee abilities.

7.2.6 Benefits of Learning in Gikomba Market

Most of the apprentices prefer training at Gikomba market because there is no fee charged on the training. The second preferred reason is that if the apprentices are keen and fast learners they can make money at the same time. This is money paid by customers for orders as received by the entrepreneurs. This partially explains why some of the apprentices are not under pressure to graduate out of apprenticeship. Table 7-7 shows the benefits the apprentices get from training in Gikomba market.

Table 7- 7: Perceived benefits of training in Gikomba market.

No.	Advantages of learning in Gikomba market	No. of respondents	Percentage (%)
1.	No fees charged on training	6	38
2.	We learn how to make other furniture items such as wall units.	3	19
3.	No pressure on learning. It's our own ability to learn fast and become an expert.	3	19
4.	We can be paid as you learn especially if you are keen.	4	24
Total		16	100

Source, Field data, 2010

Table 7-7 shows that the trainees see many benefits of training in Gikomba market that includes the fact that there is no fee, one can determine period of training and content. Because the apprentices come to Gikomba market primarily to earn a living, the fact that they do not pay fees for training is attractive to them. Furthermore, they begin to earn some money after a short period of stay and that is a strong incentive to stay. The weakness however is that it has no curriculum, no time period, no specified depth and no certification.

7.2.7 Typical Skills Acquired

Table 7-8 outlines the main skills acquired by the apprentices while at Gikomba market. The skill that nearly all the apprentices have learnt is that of cutting shapes for seats.

Table 7- 8: Skills acquired since arriving in Gikomba market.

No.	Skills learnt	No. of respondents
1.	Cutting shapes for seats	9
2.	Nailing frames for seats	6
3.	How to sew seat covers	1
4.	How to cover seat	4
5.	How to make different seat design	2
6.	How to make tables and chairs	1
7.	How to make a leather seat	1
Total		24

NB. The n is greater than the number of respondents (10) because the apprentices identified multiple skills that they had learnt.

Source: Field data, 2010

This involves using the master template or "kingi" to cut the pieces of wood on the band saw or lathe machine. The apprentices must also learn the various parts of cut wood pieces according to the design of sofa. The spread of skills imparted during apprenticeship is outlined in Table 7-8. Table 7-8 shows that nailing is the next common skill that the apprentices have to acquaint themselves with after cutting shapes. This is a skill they learn from the carpenters; piecing together the cut wooden pieces with the correct size of nails. Nailing is important for the structure of the frames and strength of the sofa. Other skills include finishing skills that include stuffing and nailing on the seat cover.

One apprentice stated that he had learnt how to make different seat designs. However from observation, his understanding of design is that it was laying out the various parts of the templates on to the wood in readiness for cutting.

7.3 *Professional Designer's Views on MSE Design Practice*

The MSE design skill is passed onto apprentices through other entrepreneurs such as the four entrepreneurs, carpenters and a few through formal training. However, this research was based on design knowledge and the views of professional designers were sought. Through focus group discussion (see guide in Appendix V), the findings from MSE apprenticeship and design process were subjected to critique by professional designers. The purpose of this was to objectively assess the design content in the apprenticeship training, its appropriateness and what can be done to improve it. The instruments and proceedings from the focus group discussions are presented in Appendix V and VI.

It was noted that the MSE apprenticeship process has several discrepancies in terms of imparting design skills to apprentices. The content does not emphasize sustainability, understanding of raw materials, anthropometry and an understanding of consumer needs. Expert designers propose that entrepreneurs seek the services of designers; they need a deeper understanding of their customers' lifestyles and living spaces; and they should attract government attention to the needs for standards and quality control. Specific reactions included:

1. Customers sometimes want what is not good for them. For example, the bulky "Lucy" sofa. The living spaces of some of the customers cannot accommodate a five seater

"Lucy" set. To the extent that it is suggested that Japan's Tupon's seat is the best solution (see Appendix X). The seat is a multi purpose, foldable sofa bed. This is in consideration of "the shape and size of most rented rooms in Kenya today." Customers want to have voluminous American type of sofa in their relatively small spaces. The professional designers view is that "the customer is not always right."

2. The entrepreneurs cannot have the capacity to undertake effective design and therefore need to include a designer in the process. There are many design consideration that need to be brought into the sofa design process. For example, raw materials - there are alternative raw materials apart from wood that can be explored; lifestyle - the living spaces are small and there is need to design sofas for small living spaces; eco design - consideration of impact of sofa production and consumption and disposal on the environment.
3. MSE do not pay attention to consumer lifestyles and needs. The sofa styles such as ODM do not appear to bear in mind the consumers space needs because it is too bulky. The MSEs do not have the capacity to research and translate research findings to sofas for consumers. The MSE sofa design needs to be influenced by consumer lifestyles.
4. The MSEs are not aware of global design trends. European designers undertake research and product development so that the trend now is on modular sofa that can be expanded or contracted according to living spaces. Modular sofa allows a progressive purchase of pieces as need arises, allows for easier transportation as one can dismantle the pieces (Appendix X).
5. The technology used by the MSEs is too low level. This contributes to wastage of wood, inaccurate dimensioning and sofa defects. Good machinery and appropriate equipment can contribute to good sofas. Information technology including computers is being used by some entrepreneurs to source for ideas and raw materials. There is inadequate use of modern technologies in design and production.
6. The training institutions do not have training specific to the needs of the MSE entrepreneurs. The carpentry and joinery courses are technology focused and do not

address design skills and knowledge in their content. Graduates of design do not operate within the MSE especially in Gikomba market. There is no incentive for graduates to join the MSE sector.

7. The professional designer's were of the view that the MSE sofa-design entrepreneurs do not have access to design knowledge in the present environment. There should be a common design office or centre where they can get design expertise.
8. The periodic change in styles in sofa is not advisable. Each sofa style requires new skills and knowledge and the MSEs do not have capacity to adapt to the changes effectively. If they specialize in one style, it is easier to train in that and to perfect production of the same. The specialization would allow the entrepreneurs to sharpen their skills in the chosen feature.

Because of the nature of design, the designers concurred that it was difficult to expect entrepreneurs to master the knowledge and skills of design. Design training opportunities for MSE sofa entrepreneurs are not available. The technical training of carpentry does not impart sufficient skills to meet the design knowledge needs of the MSEs. There is an opportunity for training institutions to develop design courses for the MSEs. There is need to involve professional furniture designers at the start of the MSE sofa design process and the most appropriate solution is the establishment of a design centre easily accessible to the MSEs.

7.4 Summary

Gikomba market apprenticeship has been discussed in this chapter including a profile of the apprentices, training content and issues. The professional designers' views of the design knowledge transfer method in Gikomba market have also been discussed. The sofa-design entrepreneurs provide apprenticeship to trainees based upon their apprenticeship and experiences. It is important to note that design training was not included in the apprenticeship training offered to the sofa-design entrepreneurs. Trainees do not pay for the training but rather they are paid after a short period of stay. Training content is not well articulated with the trainees selecting the entrepreneur or carpenter that he wants to train with. Some of the content included in training are

joinery and general carpentry, management and customer handling, with the trainee determining when he has learnt enough.

Professional designers' critique of the MSE training has been presented and includes concern for lack of design in the training. However, they also note that MSE entrepreneurs' training should create awareness of design, but it would not be expected that MSEs acquire in-depth design training. It would be better for the entrepreneurs to have access to design skills and knowledge that they can draw upon during design process phase in sofa manufacture. Some of the important issues that the MSEs do not consider presently but that design knowledge can solve in the sofa manufacture customer needs, global trends of design, new technologies and design principles of sustainability or environmentally conscious design (discussed in Chapter 3). The MSEs use low level of technology - simple workbenches, cutting and wood shaping machinery, that are manufactured in Gikomba market. Vocational training institutions offering carpentry courses, do not offer courses that address the design needs of the MSEs but focus on technical skill acquisition. On the other hand, design graduates from the universities and tertiary institutions do not associate with the MSEs and there is no incentive for them to do so. Because of the nature of design, it is necessary for the involvement of design at the early stages of sofa production. However, this cannot be done in one short course, but should be done through the establishment of a design centre accessible to the entrepreneurs, where they can consult periodically as design challenges present themselves.

8.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

8.1 *Overview*

This chapter examines two major factors namely MSE design process and apprenticeship training as variables that affect the outcome from sofa making. This was a design research that set out to investigate a design practice with the intention to contributing to theory. The nature and objectives of the research meant the research employed inductive logic to develop theory. The findings that were considered therefore in taking forward discussions as guided by the research questions included the fact that MSE sofa design practice is undertaken by sofa-design entrepreneurs who acquire their skills through apprenticeship. The apprenticeship takes periods of between three months and two years. The content does not include specific design content. Through observation and experimentation, the entrepreneurs are able to design and dimension sofa and manufacture. They have no recognized standards for measurements but these have evolved through experience. As a result, it can be observed that most of the sofas are bad. Bad sofa exhibits faulty dimensions, inappropriate stuffing, poor wood and joinery and inappropriate upholstery. The MSE sofa-design entrepreneurs do not pay attention to the customers' needs in terms of health, environment and social needs. Emphasis is placed on the price and "name."

This section answers the question of how apprenticeship can be made more effective and how design knowledge can be infused into apprenticeship training and MSE sofa design practice. The design extension services (DES) model proposed is the most ideal because it is more inclusive and involving.

8.2 *Summary of Findings*

The summary of findings presented in this section is clustered in response to the research objectives. In the discussions here, therefore, there is an attempt to synthesize the research findings vis a vis the research objectives and literature that was available. It provides a description of the MSE design practice and process including the equipment and machinery. Views from professional designers have been provided as a means of discussing the way forward for MSE design practice. This information forms the basis for the development of an appropriate framework for the improvement of MSE sofa design practice.

8.2.1 Sofa-design Entrepreneurs

The sofa-design entrepreneurs who engage in sofa design and production are drawn to Gikomba for various reasons although mostly driven by the need to make money to support their families. They acquired apprenticeship training from medium and large Asian or European owned enterprises. They have an average of secondary school education and range in age between 27 and 52 years. Within the enterprises, the entrepreneurs manage the day to day activities of the enterprise they undertake carpentry duties and train among other things. None of the entrepreneurs had specific training in design. Most of them were members of the defunct Gikomba Jua Kali Association.

8.2.2 Sofa Production

The sofa-design entrepreneurs develop their own standards and dimensions for the sofas. One of them adopts European standards while the others employ their experience and apprenticeship training to develop the dimensions. However, from observation these dimensions are not written anywhere and depend on the entrepreneurs' knowledge. This is where it can be said that the entrepreneurs have tacit knowledge which has not been codified or made explicit. Within sofa sets they have three sizes namely small, medium and large and for each of these they can produce five seater sets or seven seater sets. One sofa set production can involve up to six mini enterprises from photographers to upholsterers and ornament makers. Any or all these mini enterprises can affect the sofa outcome - good or bad.

Quality control in the sofa can be further compromised by the choice of raw material. Sometimes MSEs use wood that is not appropriate not is it agreed up on by the customer and this can cause defective sofas. In stuffing, unscrupulous artisans use waste fabric and wood waste that causes deformation on the structure of the sofa. Finishing fabric is now available in various qualities and only a keen artisan is able to differentiate the quality of fabric. This confusion in quality is used by some entrepreneurs to save money and maximize on their profits at the expense of the customer. Only one sofa-design entrepreneur pays attention to quality consistently which makes his sofas more expensive than the others.

MSE sofa entrepreneurs use simple tools and equipment. Lathe machines and band saws are some of the bigger machines used in production and processing of wood. Most of these machines are co-owned among the entrepreneurs. The machines are fabricated within Gikomba market by Gikomba engineers (see Chapter 2). Whereas, these machines are affordable for the MSEs, they are not calibrated and therefore cannot have a very high degree of precision. The precision machines cost up to three times more than the Gikomba machines.

MSEs sofa entrepreneurs do not specialize in one style of sofa and have periodic changes in style. Politics seems to be a very strong driver for style change as can be seen with ODM, Lucy and Aga Khan styles.

8.2.3 MSE Sofa Design Process

The sofa design process that the entrepreneurs follow is difficult to articulate but attempts have been made to illustrate it as a five-stage process beginning with the customers brief or order. Experimentation using "trail and error" methodology follows in which brainstorming, experimentation, sketching takes place. Templates (*kingi*) are developed from the brainstorming after-which production is started. According to the professional designers, drawing ideas from customers is not the only way to generate sofa ideas. The customers, if not well versed with design principles, will not provide good ideas (see Appendix VII). For this reason, the professional designer's have proposed that MSE sofa-design entrepreneurs need to interact with designers as early as possible in the design process. The professional designers were categorical that the MSEs should engage with designers, but that they cannot become designers. They are better placed to concentrate on enterprise management and to consult designers to solve design problems for them (see Appendix VII). On the other hand, the sofa-design entrepreneurs do not want to get into formal training to enhance their design knowledge and skills. Moreover, the periodic changes in sofa styles means that the entrepreneurs would not be able to keep up with the knowledge required.

8.2.4 MSE Design Skill Acquisition

The sofa-design entrepreneurs acquired sofa making skills through apprenticeship. However, unlike the European type apprenticeship or the West African traditional apprenticeship, the informal sector apprenticeship found in Gikomba market is not well articulated in terms of content,

time, cost and learning outputs. The apprentices select the person they want to train from, they decide on period and content of training (see Tables 7-5, 7-6 and 7-7). Design knowledge is not put into the content of apprenticeship at any time (see Table 7-8). In the model presented by Ogada and Moturi (2006), technology transfer process for MSEs is acceptable, but no information is available on its success, failure or challenges. The School of the Arts and Design has not had any contact with the initiative. It can be deduced that product design is not considered as one of the key skills that should be addressed for the MSEs. The 4K initiative involves strong MSE or Jua kali associations, but the KNFJKA has weaknesses that will impede the implementation of the technology transfer programme.

8.2.5 Professional Designers' Views on MSE sofa-design Practice

Professional designers were categorical that MSE must involve designers in the design process. The designer has the capability of monitoring trends in order to design new models and styles, is aware of new technologies, new materials, new uses/functions and Global trends. They also state that it is not necessary for the designer to be employed at the enterprise because it would be expensive and they would not be needed on a daily basis. Whereas, this is one strategy for MSE design process, experience with entrepreneurs and arising from some of their observations, product design can be enhanced through other means. This includes exposure through exhibitions, rewarding best practices, competitions and information sharing. The sofa-design entrepreneurs seemed eager to have an opportunity to show their best designs through a public exhibition. They also suggested a screening process through which they could be graded and certified. This is a process that ATA has used successfully in product development for informal sector and craft sector. Further, the engagement of consultant designers will also result in improved sofa sets.

8.3 Conclusion

Arising from the findings several conclusions have been developed in regard to sofa design practice, design process, skill acquisition and production process. It is imperative to intervene in the present sofa design practice because the present practice encourages the development of bad sofa. The MSEs will continue to create jobs, which is in line with the Vision 2030, but, attention needs to be paid to the quality of those jobs and their ability to sustain the needs of the apprentices. More resources need to be put into the development of informal apprenticeship to ascertain that it

responds to the needs of the trainees as well as the government. Apprenticeship or vocational training in its present form does not appeal to the apprentices. The government through the 4K initiative and other interventions should facilitate such acquisition. Standards of good practice, raw materials, dimensions and practice need to be developed specific to the MSE sofa industry. The research institutions such as the university and other stakeholders can assist in the development of standards and the training of MSEs on how to maintain them. The 4K initiative needs to address the issue of quality and standards in sofa and other furniture production. Moreover, research into changing lifestyles and social trends needs to be fed into MSE sofa design as they produce much of the sofas for the majority of the population.

The MSE sofa design process is mainly a trial and error process. This shows that the process has inbuilt uncertainty in terms of output and procedures. When compared with the other design processes, methods and models, can only lead to a conclusion that several design processes are applied to different situations. That there can be more than one design process that can lead to good sofa. As seen in the exemplars of different sofas, all of them good in their own way, responding to various needs of customers, there is more than one design principle of design that can be applied in MSE sofa design. Brainstorming and experimentation with little external support can only mean resource wastage.

By virtue of their training, the sofa-design entrepreneurs appear slightly higher than the Non-designers (Figure 3-5) in the hierarchy of design abilities. Through apprenticeship, entrepreneurs are able to produce sofa that are reasonably well finished as seen in Figure 6-4. The training does not cover design knowledge but the technical ability enables the Gikomba entrepreneurs to realize sofa that looks technically good. This ability also poses a problem for design because once the entrepreneurs know that they can piece together a sofa, they think they know enough to start their own enterprises. They do not seem aware of the importance of getting proper training.

The sofa-design entrepreneurs are eager to be recognized by the government and given an opportunity to institutionalize the informal apprenticeship. This is a good idea since they are the trainers and they know what content needs to be inputted. However, they need the input of designers to develop the design content that is presently the critical missing component. The efforts of the sofa-design entrepreneurs will ensure the training is better received by the apprentices because they operate within that environment and understand the needs of the apprentices.

The MSE sofa-design shows a leaning towards user centered design and sustainable design through the development of dimensions that according to customer needs. Moreover the entrepreneurs go to great lengths to try and realize the sofa that the customer wants. They domesticate designs from international journals for customers thus boosting their social and economic standing. Some of the entrepreneurs are aware of concerns for eco design, stating that wood is increasingly becoming rare (see Appendix II- G2). However, most of them choose to use whatever is available. The quality of the sofa is determined by the customer needs with the entrepreneurs charging prices according to the needs. However, there is a very strong urge for entrepreneurs to engage in inappropriate behavior, cheating customers and using bad woods (see Table 6-3 and Figure 6-4).

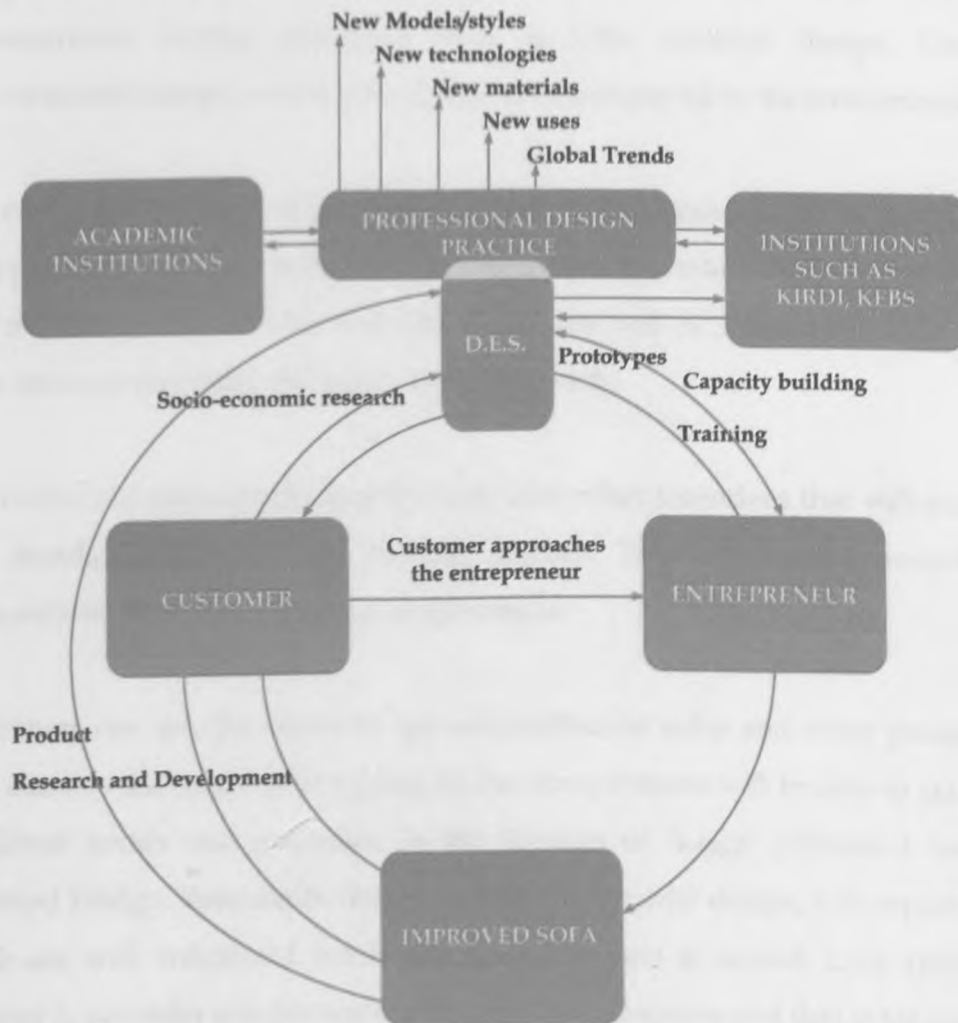
8.4 Recommendations

Arising from the conclusions above, this research proposes a design extension services (DES) model for the improvement of MSE sofa design practice. There are very many variables and aspects of the sofa design practice that impact on the finished sofa. Design problems on the other hand have no definite solution that can be prescribed as the only way to achieve good sofa. It is therefore recommended that the sofa-design entrepreneurs be mobilized and facilitated to develop a training programme for the apprentices. This would standardize the training programme with anticipated outputs. The developed training will complement the DES model services that is proposed, which is a one-stop shop design consultancy kiosk that can be developed within Gikomba market where entrepreneurs can consult with professional designers and other stakeholders as shown in Figure 8-1. The kiosk can operate much like the ITDG Migori workshops, the IDIL workshops or the Ghana TCCs except that the focus would be on design training and capacity building as opposed to technology development which is the focus of the other workshops.

In reference to the Moturi and Ogada (2006) proposition for technology transfer, the DES unit would be the extension point at which public institutions converge to impart knowledge from research and development activities. Within the DES unit, design information would be made available; design professionals and students would be available; testing, researching and sharing information with entrepreneurs as shown in Figure 8-1. Information on new sofa designs would be

made available to entrepreneurs and stakeholders at the DES centre. New markets, new raw materials and technologies can be made available at the centre.

Figure 8- 1: Design Extension Services Model



Source: Author, 2011

The DES unit needs to be conveniently located within Gikomba market. Like the Migori Jua Kali workshop and borrowing from IDIL, Mozambique centre the unit can be equipped with appropriate machinery and have access to computers and Internet. In the context of the research problem, the DES centre would:

- a. Provide a forum where the government and other stakeholders can meet for purposes of training, getting new information, developing courses for apprenticeship, exhibition and new technology transfer. This would save the government the resources being spent on for

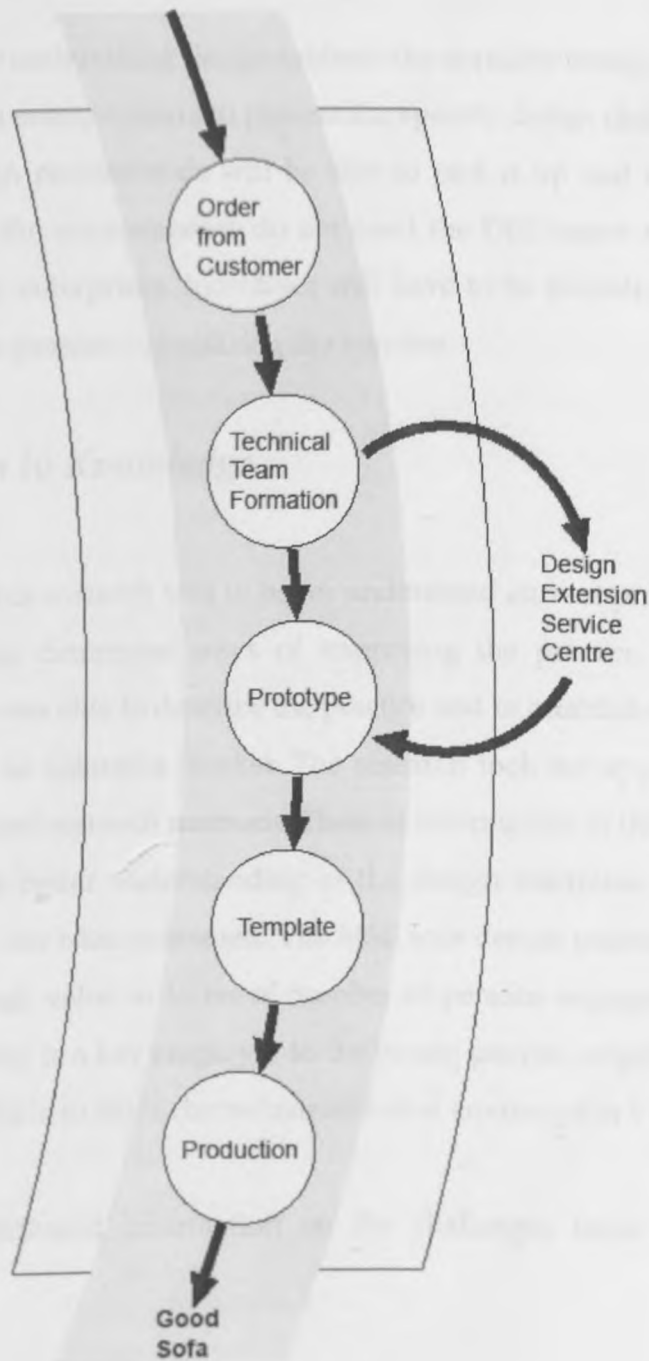
example, the MSE resource centre. It would complement the 4K initiative and provide a research centre where new knowledge can be generated.

- b. Design trends and styles such as the Japanese Futton could be disseminated to the intended entrepreneurs. Design principles such as User centered design, Universal design, environmental design, sustainable design can be imparted to the entrepreneurs.
- c. The centre can be a learning centre for example, the design students can co-learn with the entrepreneurs and apprentices thus allowing for information sharing. The use of equipment and machinery that will be available at the unit will be maximized, thus reaching out to more trainees especially the youth, more efficiently.
- d. The centre can also complement training with other incentives that will encourage quality and standardization in sofa making practice. This can include running exhibitions, competitions and other exchange programmes.
- e. Customers can use the centre to get information on sofas and other products. Customers who come to the centre before going to the entrepreneurs will be able to get information on the latest trends and materials. In the theories of design (discussed earlier), the User Centered Design, Sustainable design and Environmental design, it is expected that the user needs are well articulated before the design process is started. Levy (2002) discussed in Chapter 3, provides sofa for customers with limited spaces and that is his niche market. The customers for Gikomba entrepreneurs need to be profiled accurately through research and their basic needs addressed in the sofa design.
- f. The funding for such as centre can be sought from the various institutions that are already involved in the development of this sector such as Ministry of Labour, KIRDI, KIPi and the 4K initiative funds. The private sector can also be approached to invest in the sectors growth especially banks whose presence in Gikomba market continues to rise.

The MSE sofa design process within the DES model will be more articulated. The five stage process will provide a loop in which the entrepreneur will have access to the DES centre. This will replace the technical team formed and will reduce the experimentation drastically. Moreover, the

entrepreneur will have the information they need at the centre. The suggested design process is illustrated in Figure 8-2.

Figure 8- 2: MSE Sofa Design Process within the DES model



Source: Field data, 2011

The MSE design process allows the sofa entrepreneurs to continue with their daily activities knowing that the DES centre can quickly and efficiently solve their design and production needs. This is most appropriate when they are dealing with new designs or require new technologies.

The MSEs are presently undertaking design without the requisite design knowledge and skills. The DES loop will allow the entrepreneurs to present the specific design challenge that he is facing and stakeholders and design professionals will be able to pick it up and undertake research to find solutions. However, if the entrepreneurs do not need the DES centre services, they can continue production within their enterprises. Incentives will have to be in-built into the model so that the entrepreneurs see the importance of utilizing the services.

8.5 *Contribution to Knowledge*

The main objective of this research was to better understand current practice and processes of sofa design in MSEs and to determine ways of improving the practice. Using mainly qualitative approach, the research was able to describe the practice and to establish the product design process as employed by MSEs in Gikomba market. The research took the approach of a mix method of design research and social research methods. There is information in this research that breaks new ground and provides a better understanding of the design discipline as well as information on MSEs that has hitherto not been presented. The MSE sofa design practice has not been researched on before despite its high value in terms of number of persons engaged and the monetary value. The sofa making industry is a key employer to the young people dropping out of formal school. It is therefore a strong vehicle to drive the industrialization envisaged in Vision 2030.

The research has contributed information on the challenges faced by MSEs in sofa design including:

- i. The theory developed from the research on the MSE sofa design process that is typically a five-stage trial-and-error process. Furthermore, it is also established that sofa design can take many forms depending on the design principles and the design problem. To this extent, it can be said that no single solution can adequately address the MSE sofa design problems. The MSE design practice has been discussed extensively.

- ii. The approach taken by this research of a mix of design and social research methods provides a new methodology that is not yet explored by designers and social scientists extensively. The research explored research approaches, data collection methods and methods of analysis in new combinations. This new mix of methods and procedures brings new strength to design research which is much younger than the other research disciplines.
- iii. This research provides new information on MSE design practice that has not been available. This is valuable because design research has not sufficiently focused on non designers and social scientists do not have sufficient skills to undertake design research. This then identifies an area of research opportunity that has not been exploited. It can be replicated for many products that are being produced by the MSEs in Kenya and Africa at large.
- iv. Information on the strengths and weaknesses of informal apprenticeship are presented that was not previously available. The creation of more formal and vocational institutions may not effectively address the knowledge gap unless attention is paid to the needs of the apprentices.
- v. Information on the gaps in the implementation of government policies including Vision 2030 has been highlighted. The MSE department and stakeholders can follow up on the information provided for more effective skill acquisition for MSEs. The need for institutional linkages is further strengthened by the information presented.
- vi. Substantial information has been presented that updates the literature that was available and provides a basis for further research. The research provides a basis for further research in many areas of MSE development cutting across technology, training, management and institutional linkages.

8.6 *Areas of Further Research*

There are many areas that have been identified that need further research including design research methods, MSE skill acquisition, MSE design processes, MSE institutional support, Design education and MSE products. Within the limitations of this research relationships have been established that provides a useful knowledge base. Further research needs include:

- Design research and its methodology, taking into account that design research is multi disciplinary in nature and that design problems are "wicked." Much more research is needed to open up design research for other disciplines including medicine and philosophy. It is suggested that design research can explore further the relationship between design and sociology.
- Research is needed to determine the focus and orientation of design studies. As stated earlier, design being multi disciplinary, it is necessary to confirm if the present syllabus addresses that nature of design.
- Further investigation to determine the effectiveness of the proposed DES model. DES looks at a more structured learning or apprenticeship, but from the entrepreneurship learning, other learning methods maybe more effective. Therefore, research is required to establish the effectiveness of DES and if there are other models of learning that may be equally or more effective for MSEs.
- Filling in gaps that have arisen from the research. For example, the focus was a small group of five. However, there are over 1,400 "hammer and nail" entrepreneurs whose training needs are not established. This is an area that requires further research.
- More research needs to be undertaken on design research; the appropriate methodologies, possible tools, data collection instruments and data analysis approaches. The effects of technology on design research and practice is also required.

This list is not exhaustive because the research provides quite a large collection of information that can be explored. MSE management and marketing, the role of societies and institutional linkages are other areas of interest mentioned.

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APPENDIX I a

Guiding questions for interviews

A set of guiding questions were used to prompt responses from the entrepreneurs in a non formal order. The questions were noted down on a inconspicuous note book so as not to appear too academic and serious. The questions were not presented in any order but rather presented as part of the introduction and reason for investigation. Some of the questions were presented in Kiswahili language for ease of understanding by the entrepreneurs. The guide was used more than once and the information was transcribed immediately after the field work.

Guiding questions for interviews

MSE Gikomba market entrepreneurs

Introductions

1. How long have you been in Gikomba market? How did you come to Gikomba? What are your motivations for entering sofa production?
2. What is your educational background? Apprenticeship training or any other training?
3. How many employees do you have? Trainees?
4. Tell us about the sofa from Gikomba? The styles? Raw materials? Customers?
5. What design process do you go through? How do you make contact with the customers? Choose style? Materials? Price? Etc.
6. What special style are you known for?
7. Do you associations that you belong to?
8. Why do we get bad sofa from Gikomba?
9. What do you think can be done to improve the sofas from Gikomba?

Conclusions and closure

APPENDIX I b

Responses from Sofa-design entrepreneurs

The responses recorded here were taken from four entrepreneurs identified as G1, G2, G3 and G4. The entrepreneurs selected based upon pre-determined criteria developed from the research objectives. Although the information gathered appears expansive, in the process of analysis, only relevant material has been inserted into the findings of the research in Chapter 6 and 7.

G1 - William

William is about 42 years old and has been in the furniture business for over 12 years. He mostly works alone, but occasionally he will employ part time people to work with him when he gets big orders. He does not trust the "Jua Kali" people because they can spoil a job through carelessness. He was trained through apprenticeship for seven years at Woodproducts Limited in Nairobi's Industrial Area. He was trained by a European furniture maker specializing in furniture for the European community in Nairobi. To date, most of his customers are Europeans. He moved to Gikomba Market five years ago in order to benefit from the availability of materials that he needed for production such as wood and fabric.

Before joining Woodproducts, William went up to Form 2 in formal education. He dropped out due to too much suffering and hardship at home, coming from a family of 14 children. He came to Nairobi from Siaya and went straight into apprenticeship. He lives with his family that includes six children in Kibera, Nairobi. he commutes to Gikomba everyday by six in the morning. His day starts with him organizing the work for the day, then he makes sure the raw material is available and then he proceeds to work with his "*fundis*" who start coming in at 7 a.m. They stop work at 6pm but sometimes if there is an urgent order they can work late hours. He takes all the orders and deals with all the clients. When he is away, the *fundis* will take the contact of the client and give him for follow up.

William started with personal savings of about Kshs 3,000 and tools that he accumulated during training. He works on order and although he has a small furniture workshop, most of the time he works on site (the customer's house). His scope of work includes shop interiors, bar counters, wall units and sometimes sofa. He also works a lot with architects and interior designers. He says his enterprise is worth over 1 million Kshs that includes woodworking machinery, wood that is curing and semi finished products. He pays rent of Kshs 3,000 per month plus the City Council fees of Kshs 600 per week.

He says that customers come to him because his products are "cheaper" by up to three times than the shops and better quality. Although he says his price is considered high by some customers, he maintains that these charges are still cheaper than the Interior designers charge. For the same jobs, professional designers charge too much so the customers prefer coming to him directly. Some Interior designers form part of his customers. For most Gikomba customers he may appear expensive, but he says he is proud of the quality he gives his customers, which is far more superior than the average Gikomba entrepreneur.

Through apprenticeship, he acquired skills in furniture making and he got to appreciate good workmanship. His customers appreciate good workmanship and that is what makes them come to

him. William has no problem finding customers and he is rarely without a project. These customers he gets through word of mouth or referrals from satisfied customers. He also bids for jobs and has contracts with architects, interior designers and management agencies.

His customers reach him through referrals and his contacts. He has a mobile telephone that he uses to contact customers. He does not have access to a computer services.

His products are durable. In any case, some of the products are customized and cannot be purchased in the shops such as the bar counter that we found him working on during one of our visits. He says that, "a lot of the furniture available in the shops is versatile and very well finished but cannot last, for example, the MDF coffee tables which look very beautiful but scratch easily thus leaving marks." He tries to use good wood and to make his sofas strong and durable.

On his design practice, William says that he relies on customer preferences, pictures, his own research and observation;

1. Customer preferences. A customer comes and explains/outlines what they want. Then he uses his **technical skills** to make the product a reality.
2. He also uses pictures. Photographs of products that he has made that are displayed in a photo album. He can then **modify** the product according to the customers' preferences.
3. He collects pictures from books, catalogues and magazines. He shares these with the customer and agrees on **modifications and finishing**. He then uses his skills to try and copy the design and make them same according to **customer specifications**.
4. He also does his **own research** to find out the new products and what customers prefer.
5. The other common form of design production is through **observation**. In this case, William visits furniture showrooms and other outlets with the customer and the customer identifies the suitable design. Such shops include Victoria Furniture, Nakumatt, Silentnight, Palacina and Woodproducts.

When he gets an order for a new sofa for the market, William will brainstorm about it before embarking on production. He will use his friends and try to recall similar types of problems that he has solved before. In the case of a sofa, he will create bits and pieces in smaller version using waste wood and left-overs. When he is happy with the results, he will develop the small chair and call the customer to see the frames before proceeding. If the customer is satisfied with the frame, then he shall proceed to develop the frame for the bigger sofa (3-seater) and other pieces (if it is a 7-seater). He will name the sofa as he continues with production. He does not use a formal team, but he has friends and colleagues who are in the business and who have varied skills whom he calls upon when necessary. He does not pay them for their services because he also assists them when they need his assistance.

We asked William to comment on the MSE sofa practice and his concern was for the middle men who isolate the customer from the producer. The **middleman** undercuts the producer while exploiting the customer. Like all other industries, the *Jua Kali* is under threat from conmen who have no skills except for conning potential customers. They have middle men operating in their midst who take orders from the customers and then give them to make. In some situations, the

artisan is not able to complete the products to the satisfaction of the customer because he has no direct access to the customers. This means he cannot understand the needs of the customer very well.

Ready-made furniture is another concern for the Jua kali. This refers to furniture made without a prior order by the producers. Often, this furniture is not done as well as furniture done on order. For example the fine finished sofas that can be seen by the roadside that are ready-made. The sofas look appealing but on closer observation, you find that the stuffing used and the quality of wood is sub-standard. The artisan may sometimes use wood waste as stuffing. With time and use, the wood waste collapses and the seats loose there form.

William together with his colleagues want government recognition of them as possible trainers and facilitation to develop training materials. He knows about CITC Pumwani and even the Kenya Polytechnic University that provide relevant training but he says the training is not sufficient and necessarily applicable to the Gikomba apprentices. He was a member of the defunct Gikomba Jua Kali Association but the association is not functional and the leaders have mis-appropriated funds that were collected by members. The government does not provide any services or assistance to them and yet they have the best capacity to create jobs in answer to Vision 2030. Because of poverty and hard ships, the youth are getting into employment without adequate preparation.

G2- Joshua

Joshua is 52 years old and has been in the sofa business for over twenty years. He reached Standard seven in formal education and proceeded to apprenticeship. He dropped out of school because of lack of school fees. He was trained through apprenticeship for over ten years in several Indian and European companies before starting out on his own. He said the Indian training was very intense and thorough. The Indian training was such that an apprentice was attached to a master craftsman who had specific skills. For example, he could be a joiner, in which case he receives cut pieces from the machine operators and he proceeds to join the pieces. He could be an upholsterer, in which case his duty was to work on the finishing only. The training did not allow for an apprentice to be an all rounder, cutting, joining and undertaking upholstery. He therefore, together with his colleagues, spent his free time learning the various other skills from each other at the present Kamukunji grounds. Here they worked together to produce prototypes from memory, which they used to produce sofas and chairs for the African community. He is considered a "master" and was commissioned as a trainer on the World Bank sponsored Voucher Training programme. He lives in Donholm, Nairobi with his family. He has two employees and one apprentice. When he gets big orders he hires part time staff.

Joshua gets his designs through various means such as observation, catalogue pictures and photographs;

1. He visit showrooms of furniture shops such as Nakumatt and captures the designs in the head or through photography. When captured in the head, he then goes and sketches the designs in his sketchbook as soon as he gets to his workshop.
2. He copies design from catalogues and other producers. When he copies designs from the European catalogues, he improvises the materials often choosing cheaper materials because of the customers.

Asked why he thinks he is successful in sofa making, Joshua stated that quality and efficient use of material;

1. "Quality" that is so dear. Joshua prides himself with quality products to the extent that he does not fear competition. He says that once someone has come to his shop, they will keep coming back and will bring others so he always has customers.
2. Pricing: He explains that in pricing, everyone needs to look after his or her interests in the product. It involves two people - "the consumer and me." The consumer wants to save something on the price which is - a reasonable price. Pricing is a three-pronged affair, high price for those who cherish value and uniqueness, the fair price - charged to most customers (i.e the customers preferred price), and "your" price, a price charged according to the individual customer and their demands. He has learnt the art of pricing so that it is a win-win situation.

Joshua has three working areas, one on the open air by the Nairobi River banks where most of the sofa frame making takes place. He has a one storey shop where wood and semi-finished sofas are stored downstairs, and he has his little office upstairs. This is a lot of space considering the lack of space in Gikomba. However, he does not consider expanding his business into supply of large orders for furniture, for example, for the government. He cannot engage in government contracts because, *"one; lack of financial resources for very large contracts and two, the payment procedures and payment period is too cumbersome."*

Joshua sources all his raw materials from Gikomba Market although he is aware that superior fabric for example, for upholstery is available at Biashara Street, Nairobi. He also knows that there are various qualities of fabric and when selecting a fabric, the fabric can be presented in its original form, and a cheaper version that uses mainly plastic material. Whereas the prints for the fabric will look exactly the same, the "feel" will be different and only a trained eye can detect the difference. Depending on the customer, he can opt for the more expensive, longer lasting, value guaranteed fabric but, sometimes he selects the cheaper version. Good fabric is available, but is not the preferred choice of the customers.

Joshua uses his mobile telephone to keep in touch with his customers. He also uses his PC computer to keep in touch with his European customers and suppliers. He checks the Internet for new designs regularly. He is never away from his enterprise even for one day.

Joshua develops his sofa styles from sofa catalogues, mainly from Europe. Like the prototype in Figure 0-1 that he has made from a picture. This piece was not made for an order, but is an experimental piece that is on display. He hopes that customers will notice the sofa and make orders. This is his way of producing unique styles.

Figure 0-1: Free form sofa made by Joshua



Source: Fieldwork, 2010

Joshua is the oldest entrepreneur in Gikomba market and so we asked him to provide insight into the development of furniture making industry and this is what he had to say:

Europeans have always influenced furniture design in Kenya. The early settlers developed what has come to be known as the "safari style", a style that evolved around their lifestyles. Indian furniture makers initially produced the furniture. The Indians kept a hawk eye on the African who worked in their factories and workshops. The Africans were taught specific skills for specific pieces of furniture. For example, in sofa, some were taught how to develop the arm (only), some were taught upholstery only. For this reason, the Africans memorized the designs and went and sketched them out at home, with a view to replicate them. With time the enterprising Africans were able to produce similar designs although not to the same level of craftsmanship because they lacked the sophisticated equipment.

Joshua is convinced that with time, the Jua kali entrepreneurs will be able to explore other materials away from wood. The availability of wood has contributed to the entrepreneurs' persistent use of it.

"Scarcity will create demand for alternative materials. If the price of wood becomes dearer, the entrepreneurs would be forced to be less wasteful." Awareness creation on the impact of the waste would also cause the entrepreneurs to waste less. "Waste" is not waste, particularly for the strong woods. Off cuts from strong woods can be used to make other furniture pieces.

Joshua has been a trainer of the Jua kali under the World Bank Voucher Training programme so we sought his views on training the Jua kali. He outlined a possible path to the development of a good sofa maker as illustrated in Figure 0-2. The Jua kali are increasingly getting younger entrants into the sector so training can start at about fourteen years of age. As a new entrant, the apprentice

should be under the direction of the master and should be willing to learn anything he is taught. He should not be expecting any pay for his labour but rather, should be charged a small fee.

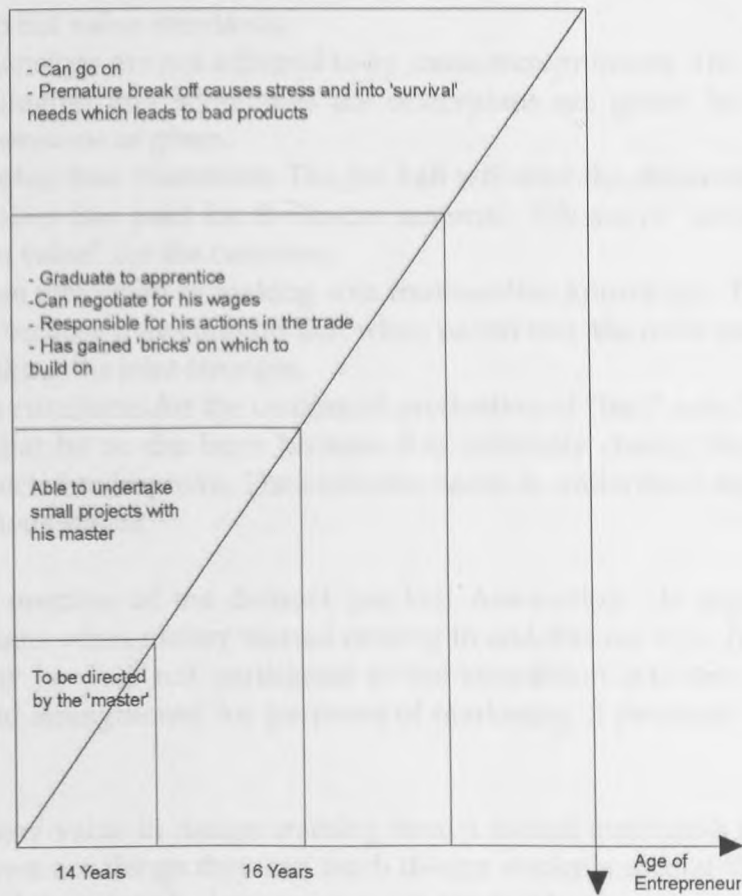


Figure 0- 2: Joshua’s suggested Jua kali apprenticeship training path
Source: Fieldwork, 2010

The training of the new apprentice should focus on development of specific traits such as ability to work with wood, technical abilities in the workshops and enthusiasm in making craft products. This aspiring entrepreneur should be able to “*slave to learn*”, working in any capacity within the workshop environment. After an initial two years, the entrepreneur-to-be can graduate into an apprentice and request for wages. He is able to identify and use some tools of the trade and undertake certain tasks under tutelage. The entrepreneur-to-be should not be in a hurry to wean-off his mentor. In fact it can be said that this is the critical stage in the development of the entrepreneur in so far as product design is concerned. Because of premature weaning, the apprentices are forced into meeting “*survival*” needs and thus starting their own enterprises. In the process, they set the stage for bad products.

He cannot venture into supplying large scale furniture because he does not have the money needed. He has a trained “*eye*” to see the “*good*” quality fabric which is a big issue in Gikomba Market because the fabrics of both good and bad quality are very similar. Wood is increasingly scarce and Joshua acknowledges that there is need for exploration of other materials apart from wood.

Joshua was asked to comment on the issues affecting the MSE sofa makers, and he acknowledged that sometimes.

1. The Jua kali do not value standards.
2. European dimensions are not adhered to by some entrepreneurs. The sofas are copied from European catalogues and sometimes the dimensions are given, but the Jua kali do not follow the dimensions as given.
3. They do not value their customers. The Jua kali will alter the dimensions and material even after the customer has paid for the better material. The act of "cheating" is what Joshua refers to as "no value" for the customer.
4. The Jua kali use wet wood in making sofa frames-often knowingly. They even like to work the wood wet because they contend that when nailed wet, the nails rust and expand into the wood thus making the joint stronger.
5. Joshua blames customers for the continued production of "bad" sofa. If the customer is only price driven-that he or she buys because it is relatively cheap, then quality of furniture cannot be expected to improve. The customer needs to understand and monitor production process at various stages.

Joshua is a founder member of the defunct Jua kali Association. He says the association was penetrated by politicians when money started coming in and this led to in fighting and collapse of the association. Today he does not participate in the association activities although he thinks it should be revived and strengthened for purposes of marketing of products and lobbying for their rights.

Joshua does not see any value in design training from a formal institution like the University. He however says that there are things they can teach design students so that they can produce better sofas. He says many of the things he knows are not in the text books.

G3 - Wambua

Wambua laments that over the past few months the City Council has embarked on clean-up of Nairobi River and this has affected the sofa frame makers because they have had to squeeze away from the river banks. They are also prohibited from throwing any waste into the river. The clean-up of the river has improved the working environment. The entrepreneurs are hoping that the Nairobi City Council will allocate them alternative site from which they can work. The Nairobi City Council has increased the rates on the open air entrepreneurs from Kshs 25 daily to a weekly fee of Kshs 500. This is in spite of the Councils' non-committal in allocating alternative site. Furthermore the Council does not provide any basic amenities such as toilets or water to the entrepreneurs.

Wambua has never considered relocating his business despite the inconveniences. He is 47 years old and has been in Gikomba for 17 years now. He came to Gikomba to join his uncle after lack of school fees forced him out of school. He was in Form 2 and due to poverty his family could not continue to pay his fees. He is the eldest of five children and came to work in order to pay fees for his siblings. He got married shortly after coming to Gikomba market. His wife took a loan of Kshs 2,000 to help him start off the business. He has been able to see his siblings through secondary school and one of his brothers now works with him in his enterprise. He owns 2 stalls and co-owns one lathe machine within Gikomba Market.

Wambua has no permanent employees except himself and his brother. He has several trainees and freelance carpenters. He says there is no need to have permanent employees because you cannot guarantee them work. Moreover, there is always labour available when big orders come suddenly.

The demand for the sofa frames has increased from last year. Now, Wambua sells 15 sofa set frames per day between Monday and Saturday. On Sunday he sells 10 sofa set frames on average. He attributes this to new sofa selling businesses that have opened up around Nairobi. In the less than one hour that we were with him, there were three full pick-up vans loaded with sofa frames for various destinations along the road showing the demand is high.

The newest sofa design coming into the market from Wambua is "Nakumatt". Wambua has named the sofa Nakumatt based upon the source of design idea. He copied the design from a sofa in a Nakumatt Supermarket for a customer. The customer came to explain about the sofa to Wambua and because he was not too sure, they went with the customer to Nakumatt where he was able to see the sofa design. He went back to his enterprise and tried out the frame on waste wood. In the first attempt the frame failed because it could not hold together and there were other problems. He tried again with his technicians and the second time they succeeded in the frame. He went ahead and covered the second sofa with the furnishing. He then called in the customer to see the "prototype" which was proportionally smaller than the real sofa that was to be made for her. The customer was satisfied with the "prototype" and the selected fabric. Wambua then proceeded to make the final sofa. At the time we visited him, they were still working on the frame for the seven piece sofa set.

Wambua has three apprentices directly recruited by him, while several others work with the carpenters he sub-contracts. The apprentices do not pay anything and can be there for between six months and several years. Wambua pays them a portion of money that customers pay for the frames. Sometimes they make Kshs 100 per day or they can earn Kshs 300 on ago day.

When asked to comment about some defects on the material that Wambua was using for a sofa frame, he said it was because of the customer. He makes sofas according to the taste of the customer. He can however make a very good "five-seater" sofa set for Kshs 65,000. He can use good material and even use Mahogany for the frame.

When asked how he gets his dimensions for a new sofa such as "Nakumatt" he said, "We set our own standards and dimensions. We can make equal or even better quality than the imported furniture." He has confidence in his ability and would want an opportunity to produce his "best" design for an exhibition so that people can see and appreciate "good" design from the Jua kali.

When asked about standardization, Wambua stated that, "we set our own standards and dimensions. Everyone does that here. We can make equal or even better quality than the imported furniture." For example, a sofa like ODM, is made in three sizes, small, medium and large. Once the entrepreneur develops the first templates or "kingi" as they refer to them, they are able to adjust the dimensions and come up with the variations.

He would also wish for the government to recognize them as good trainers and give them an opportunity to train the "youth." Although they are training so many youths, the government does not want to recognize them.

He would like to have some training in design so that he can be better than the competitors but, he does not want to go to a "formal" training college like the University.

G4 - Maina

Maina is the youngest of the entrepreneurs that was interviewed at 27 years of age. He trained in carpentry at Thika Technical Training and he attained a certificate after 2 years. Some of the units he learnt included wood treatment, carpentry and joinery, machine and equipments, technical drawing and finishing. His knowledge of IT and use of Internet has helped him continue to stay ahead of competition. He joined his father in Gikomba Market who is also a carpenter. They were joined by his sister and together they run the business as their father proceeds into retirement.

The strength of their business lies in the fact that:

1. He has formal training in carpentry.
2. He imports wood from Democratic Republic of Congo (DRC) through registered importers for his good furniture.
3. He gets modern designs from the Internet and therefore his sofas are trendy.

On his design practice, Maina says that apart from the designs that he gets from the Internet,

1. His customers always come up with the design they want.
2. Sometimes he experiments with new designs which he displays in his showroom and people can make orders after that.
3. Sometimes he copies designs from other people if he sees something interesting.
4. Sometimes he gets design from catalogues and sometimes through market research.
5. He attends exhibitions at the KICC or Sarit centre to see new designs.

Maina was asked to comment on the reasons for "bad" sofa from the Jua kali and he had this to say:

1. There are no incentives to make the Jua kali produce very good furniture. They also do not have the right machinery.
2. There is no division of labour within MSEs and everyone learns the same thing. Wood takes between six to eight months to dry properly for use, however, often, the Jua kali cannot wait. Moreover, he laments that there is a shortage of wood for furniture and so they cannot produce too much.

On ways and means of improving the sofa industry, Maina added that:

The government needs to facilitate continuous training for the Jua kali especially because they supply furniture to even the medium and large stores. He said that they can make equal or better furniture than the imported ones and can help the country save money in importation of sofas.

The people in the industry are presently setting their own standards. They need to get together and come up with industry guidelines and standards for production. Kenya Association of Manufacturers (KAM) is supposed to help with standardization but they do not seem interested in the Jua kali so the artisans are "on their own."

On training for better sofa production, Maina stated that, "the best furniture does not come from the professional designers but rather the well apprenticed Jua kali. Directorate of Industrial Training (DIT) has a good training programme for carpentry skills. The designers from the University should reach out to the Jua kali and not wait for the Jua kali to go to them because the Jua kali will not go to the University.

There is need to educate the MSE customers on alternatives to wood which perform just as well such as Sheshan wood from India, MDF laminated Formica from Malaysia and recycled wood because customers are influential in what the MSEs do. If the customer is educated then the demand for solid wood will be reduced and the MSEs will use alternatives.

Production costs for sofas are high. Although quality matters, about 30% of cost of production is allocated to labour. When the design is ornamented it will take longer (up to 2 months for a Swahili type four-poster bed) and will be more expensive.

Because of intense competition, there is a price war which necessitates that the entrepreneurs use cheaper alternative material that is sometimes sub-standard. A well finished loose cushion for example will cost Kshs 2,000 and yet, a similar cushion, stuffed with foam chips or hair fibre or wood waste, will cost as little as Kshs 500.

Maina was not aware of design that is taught at the University. He does not want to learn any more design however he sees a possibility of working with the University so that an inclusive curriculum can be developed for apprentices. He says with the university involvement, the market will take them more seriously and buy more from them.

APPENDIX II

Observation of MSE brainstorming session

Date 27th July 2009

Time: 3.40 p-m.

Venue: Collins' office – Gikomba Market

Purpose: To gather information on how brainstorming is undertaken within Gikomba Market.

Researchers: Cecilia, Sophia and Principal researcher.

We were welcomed into a small upstairs office belonging to Collins. The stairs leading to this office space were very narrow. The office has a small window that over looks the Kombo Munyiri Road below. From his sitting position the entrepreneur can see some of the activities taking place in his workshop below. Occasionally he will call out one or two of his charges to take care of some business. He has a Land line on his desk, a computer and printer, two photo albums and office stationery. He summons his team through his mobile. When they arrive we cannot all fit in the small space, so my two research assistants have to leave. The office has only one visitors chair and all the three members of the group have to remain standing.

Two of the team members were not employees of Collins. They were there for that specific assignment. Odhiambo was the first to arrive; he is a carpenter who appeared to have many years of experience in carpentry and joinery. He was about 42 years of age. James and Mureithi appeared shortly after. They seemed to be about 23 years of age. Mureithi was the only member of the team that had formal training in carpentry and joinery. He had attended CITC Pumwani and specialized in wood work. He had also done some training with Undugu Society at their workshops in Shauri Moyo.

I imagine if I was not there, the group would have moved downstairs to where the incomplete seat was placed in the open space. My presence affected the session and flow of brainstorming. I interrupted occasionally to indulge questions.

The session was a continuation of other meetings the team had had earlier. The adjustable reclining chair had been brought from one of the Furniture stores in Nairobi more than three weeks earlier. It was imported new but the shop attendants had failed to assemble it properly and it failed to function. This was not the first time that Collins had received such an assignment. A week earlier he had delivered a baby cot that he had repaired after it malfunctioned from the same store. He was confident that they would find a solution.

Odhiambo discussed how he had looked at the joining systems in the chair. He had dismantled some levers and tried to realign them. Mureithi suggested they call in an engineer to have a look at the levers and internal systems to establish the engineering problem, if any. As a result of Odhiambos' repairs, the seat could recline – minimally. However, it was supposed to lie flat when fully reclined. The next day they would re-group to review the outcome from the engineer.

Conclusion: Most of the innovations and creative input for sofa and furniture in Gikomba is undertaken by groups. These groups are made up of technically competent individuals, who are recruited for specific knowledge or skills. The entrepreneur controls the extent of involvement at any one session, and the tasks to be undertaken away from the sessions. For example, he asked

Odhiambo to identify the engineer so that they may sit with him. But, Odhiambo and James (the other team member), are not employees of Collins and are not under pressure or any obligations to make productive contribution.

Observation: The team meets periodically depending on the work or assignment that needs to be solved. The team members and composition is based upon the assignment. Brainstorming is quite informal and it is led by the entrepreneur.

It is difficult to assess their level of commitment to the assignment. They have networks that include engineers that make it easier to undertake complex assignments.

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APPENDIX III

MSE Associations in Gikomba

The MSEs and apprentices were asked to list the number of societies/ associations that they belonged to within Gikomba market. Most of the associations were welfare groups that benefitted their members when they were bereaved or deceased. The response was:

1. Ufundi Cooperative Society
2. Baba Ndogo Carpenters Association
3. Small Dandora Association
4. Luo Wadu Association
5. Chama Cha Wanaume Society and Cooperative
6. Huruma Self Help Group
7. Machakos Self-Help Group Association
8. Bidii na Kazi Association
9. Tala Boys Association
10. Vijana na Kazi Organization
11. Family Merry -go-round
12. Undugu Cooperative

APPENDIX IV

Focus group discussion with MSEs

Date 30th November 2010

Time: 3.40 p-m.

Venue: Collins' office – Gikomba Market

Purpose:

1. To confirm earlier findings and gather data on sofa measurement and standardization.
2. To confirm the benefits/problems of associations and societies from earlier data.
3. To confirm government support.
4. To confirm the machinery that they utilize in sofa production.

Researchers: Eunice and Principal researcher.

Present: Collins, Mureithi, Maina, Onyango and Wambua.

We had a short brainstorming session to ascertain the measurements that are appropriate for a single sofa seat. We tabled the various measurements that had been tabulated. As a result and through consensus we were able to agree on the measurements presented as standardized. It may be noted that some of the measurements are already standardized although not documented anywhere. For example, the standard size of a single cushion is 20 inches x 20 inches x 5 inches and these come from the manufacturers as such. The densities of cushions vary and the cheapest is Standard, followed by medium. The best cushion from the MSEs is the “Bonded” (the multi coloured foam pieces that are bound together into a solid cushion) followed by the high density cushion.

1. To confirm MSE sofa measurements.

A standard template was prepared for measuring a standard “Jumbo” single sofa. The templates were used to measure the sofas from the 4 entrepreneurs who were under study.

Table 0- 2: MSE Sofa anthropometric analysis table

No.	Description	Measurements in centimeters				
		Jumbo 1	Jumbo 2	Jumbo 3	Jumbo 4	Stand.
a.	Loose Cushion					
b.	The height of the seat.					
c.	The height of the armrest.					
d.	The length of the armrest.					
e.	The height of the backrest.					
f.	The width of the cushion at the back.					
g.	The depth of the seat on the inside.					
h.	Width of the backrest.					
i.	Width of head rest at the top.					

Source: Field data, 2010

2. Benefits/problems of associations and societies.

Some of the benefits include:

1. Small loans that can help with starting a business.
2. If a member is bereaved, they contribute money.
3. They contribute to buy machinery and pay City Council.
4. In case of conflict, the members present their grievances to the others at a meeting.

Some of the problems faced in the associations include:

Poor turn out at meetings when called.
Death of a member with outstanding debt/loans is discouraging.
Late or non-payment of contributions by members.
Members are few in number.
Mismanagement of funds and contributions.

3. Government support

Asked about government support the MSEs response was an emphatic No. they have no relationship directly with the government. This response agrees with an interview with the DO in which the DO who had been there for just over 3 years stated that they were not particularly involved with the MSE furniture makers. The only administrative official constantly involved with the sofa makers was the Chief who receives periodic complaints from customers of MSEs or the MSEs themselves. The chief was able to outline the areas of conflict between MSEs and their customers in regard to sofa sets. These are reported in findings section of this thesis.

4. Sofa making machinery

The typical machinery that is used in making sofa and other furniture were identified as:

1. Sanding machines
2. Grinders
3. G-clamp
4. Cutting machines
5. Benzo machines
6. Hack saw
7. Circular saw
8. Sanding machines
9. Electronic saw
10. Sawing machines

APPENDIX V

Guidelines for focus group discussion

Professional Designers Session

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This is to invite you to a focus group discussion that will be held on
1st July 2010 at RM 237, ADD at 9.30 am.

Title:

Product Design Practice within Micro and Small Enterprise (MSE) Sector in Kenya

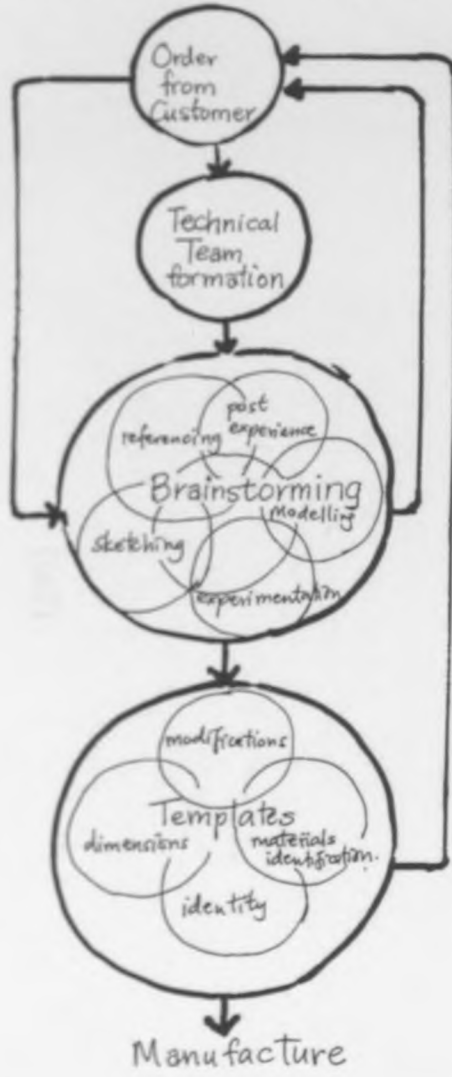
Case Study of Sofa-makers in Gikomba Market, Nairobi



Lilac Osanjo
School of The Arts and Design
University of Nairobi
Tel: 0722743307
Email: lilac.osanjo@uonbi.ac.ke

1. MSE sofa making practice

The MSE sofa makers develop sofas through the process outlined below. Examine it critically and answer the questions that follow.



1. Is taking orders from customers the best way to initiate sofa design? Yes No
2. If No, Describe another method of generating sofa design styles.
3. Do experienced designers engage in technical team formation? Yes No
4. If No, describe another alternative to technical team formation.
5. Who do you think should be members of the technical team?
6. Is this form of brainstorming the best way for MSEs? Yes No
7. If No, describe another method of solving the technical problems for MSEs.
8. Is the development of templates the best way for MSEs? Yes No
9. If No, describe another method of getting dimensions and detailing.
10. Describe two ways in which you could improve the sofa realization process.

2. Considerations for sofa design

Here-below are some considerations that influence sofa design. Please rank them in order of importance in which 1 represents the most important consideration and 8 the least consideration.

No.	Description	Ranking (1-8)
1.	Specialize in one style	
2.	Consumers individual taste	
3.	Sustainability	
4.	Close supervision of production	
5.	Identification of materials	
6.	Maintenance/repair	
7.	Pricing	
8.	Other (specify)	

3. How can design knowledge of MSE entrepreneurs be enhanced?

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APPENDIX VI-

Proceedings of focus group discussion

PHD MEETING HELD ON 28TH JULY 2010 IN ADD DESIGN STUDIO BETWEEN 10 AM AND 1 PM.

Present

Lilac Osanjo – Presenter and principal researcher
Millie Otina – Product Designer – Recording Proceedings
Steve Gachie – Designer
Leonard Mcharo - Architect
Joyce Akach – Industrial Designer
Samuel Maina- Industrial Designer
Charles Ouma – Textile Designer
Lorraine Amollo – Industrial Designer
Kamau – Technologist/Artisan
Simon – Technologist/Artisan
Maina – Technologist/Artisan
Kimani – Technologist/Artisan

Lilac introduced the topic of her study, “MSE product design and development: Case study of Gikomba Market sofa makers.” She gave an update of findings so far in relation to design practice. Then she took the meeting through the session using guiding questions (see attachments).

QUESTION	RESPONSE
1. Is taking orders from customers the best way to initiate sofa design? Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes, because that is the only way they know how to order. Customers prefer to order what they are seeing. Customers also have specific preferences so they need to decide what they want. The sofa is cheaper if the customer comes to the MSEs. It is also expensive for MSEs to undertake research.
2. If No, Describe another method of generating sofa design styles.	They can undertake research and establish how the customers live and what they do. They can consider recycling or better use of raw materials. But this requires resources – time, money and knowledge. There is also the risk that people may not buy the sofas. The sofa sets are all the same and it does not make economic sense for all of them to produce the same sofa so they should diversify. Most firms now opt to import sofa e.g the leather sofas. They cannot see the need to change because they are doing economically well and the customers keep on coming. When they have agreed with the customer they improvise on materials so as to maximize their profits. MSEs do not want to think and there is no motivation to do things differently.

	Function and performance based upon the lifestyle of the customers, for example, a sofa bed would be appropriate for small living spaces such as those of most Gikomba customers. The MSEs can make some prototypes and exhibit them so that the idea is seen. They also need to invest finances for prototypes.
3. Do experienced designers engage in technical team formation? Yes <input type="checkbox"/> No <input type="checkbox"/>	No. They have skills and knowledge to undertake research and development where necessary. They also sub-contract but not sitting down in a team like the MSEs.
4. If No, describe another alternative to technical team formation.	Sub contracting. Outsourcing. Research and development. Internet.
5. Who do you think should be members of the technical team?	Sub contracting. Outsourcing. Research and development. Internet.
6. Is this form of brainstorming the best way for MSEs? Yes <input type="checkbox"/> No. <input type="checkbox"/>	Technical experts in MSEs are individuals who have been sacked or retired from medium size manufacturing firms. They are not paid and they have an informal network within Gikomba Market. Designers, merchandisers, craftsmen, upholsterer's, marketers, entrepreneurs.
7. If No, describe another method of solving the technical problems for MSEs.	Yes. This way, they do not pay for professional services, or for the time, it sustains production, and solves problems instantly. Decisions are made quickly and many people are involved in the decision thus reducing risk of bad sofa. No. There is no guarantee of completion as there is no follow up plan. Lack of incentive for members, lack of new intellectual property protection and lack of commitment from members. They also use the time to copy ideas.
8. Is the development of templates the best way for MSEs? Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes. This way, they do not pay for professional services, or for the time, it sustains production, and solves problems instantly. Decisions are made quickly and many people are involved in the decision thus reducing risk of bad sofa. No. There is no guarantee of completion as there is no follow up plan. Lack of incentive for members, lack of new intellectual property protection and lack of commitment from members. They also use the time to copy ideas.
9. If No, describe another method of getting dimensions and detailing.	MSEs can outsource, employ experts or get committed persons whom can provide good designs. It is very important for MSEs to develop templates. Even big companies have these templates. But they need to be technically sound in dimensions and size. The MSEs can outsource.
10. Describe two ways	Include designers in the process of sofa design and

in which you could improve the sofa realization process.

development. **Undertake research** so that they are aware of new materials and cheaper sources of raw materials; **pay more attention** to the customers needs and life style; **understand through feedback** how sofas perform so that they may be able to improve designs; **consider modular sofa** because it is cheaper to transport, expand and is versatile to fit in the living rooms-this is the global trend today; **embrace technology** in design and production; government needs to **impose restrictions, quality control** and material imports; design schools can also formulate **training programmes** for MSE design needs; try in-house training of entrepreneurs. Develop a common **design centre/office** in which design training can be undertaken; consider **specialization** by for example, style by entrepreneurs.

If we **create a design centre**, such as the former Product Design and Development Centre (PDDC) then stakeholders can get a forum for networking. Form partnerships such as the Terra Nuova partnership with the School of The Arts and Design in which students, Jua kali and professional designers all participated for the benefit of all.

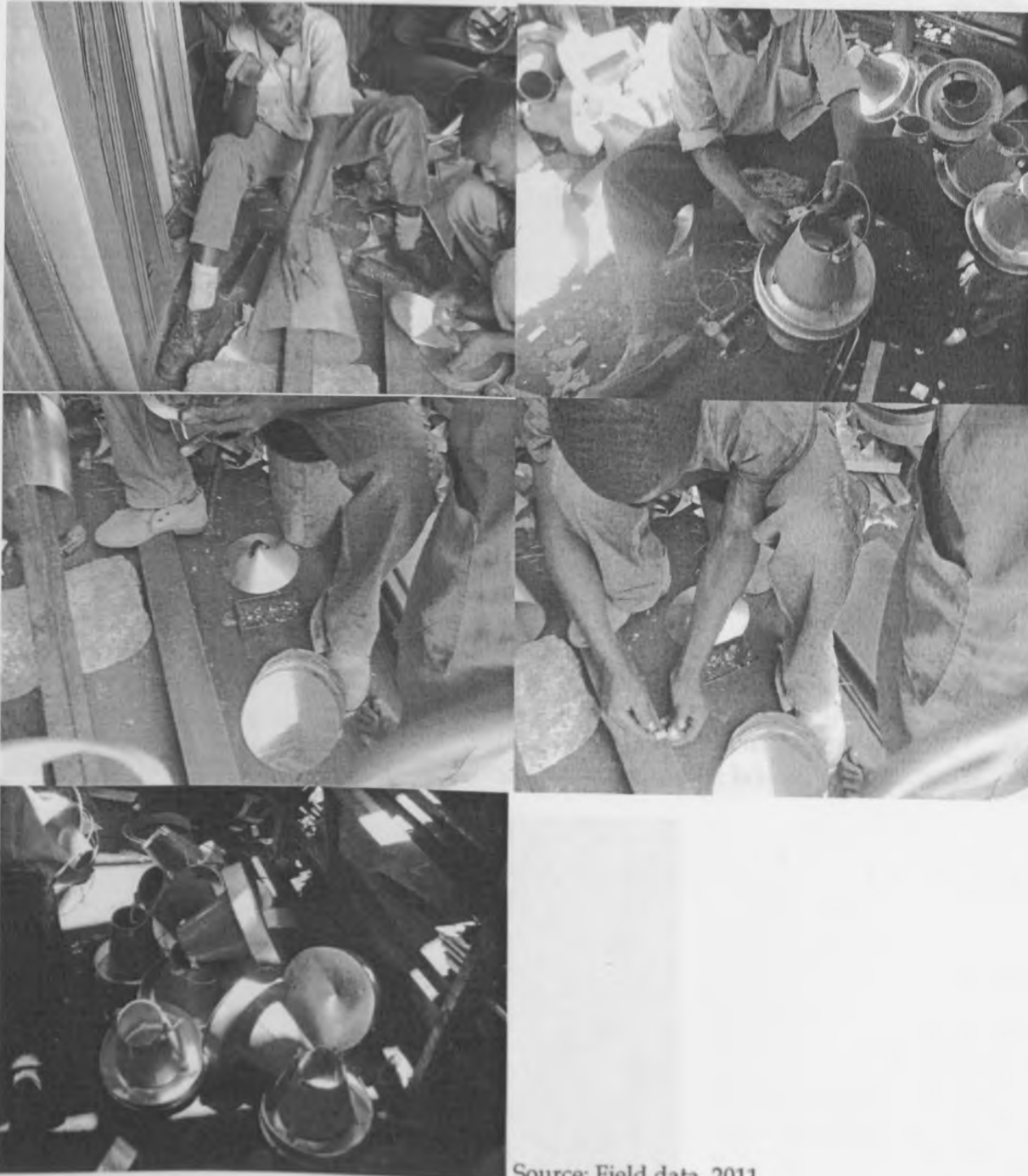
A **reward system** would also be good whereby competitions are held and awards given for various achievements.

Mobilize the entrepreneurs into **cooperatives or clusters**. Use the cooperatives to channel training and capacity building.

APPENDIX VII

Insights into MSE manufacturing processes

a. Design and development of tin products in Gikomba



Source: Field data, 2011

The design of the products can be traced back to research and development by ApproTech and international NGO. They developed templates and trained the artisans on how to transfer the designs, cut, shape and finish the products to precision. The entrepreneurs continue to replicate these designs and train others.

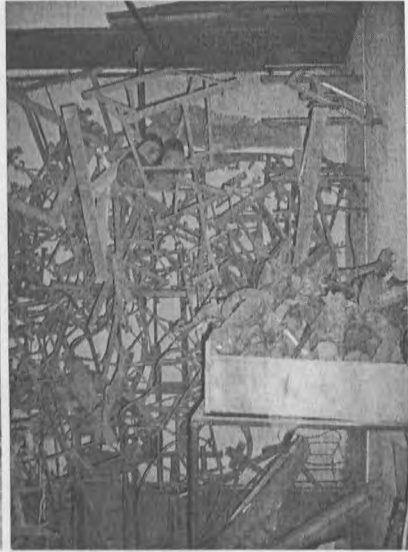
b. Jigs and Moulds used in furniture production



Templates for sofa



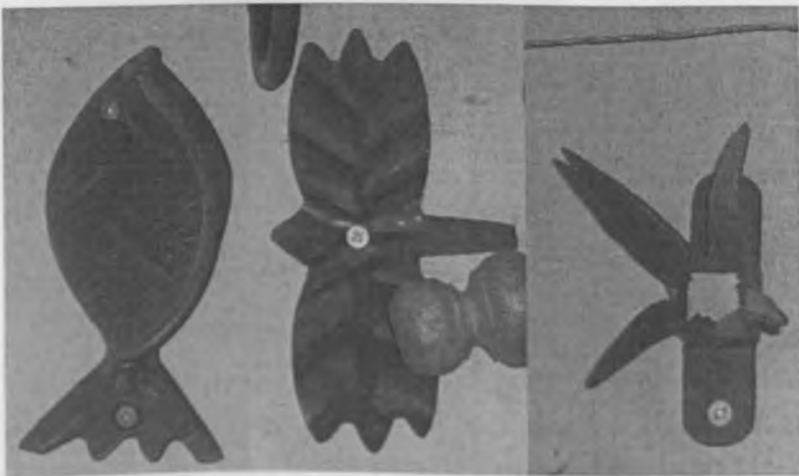
Locally fabricated machine used to cut patterns.



Metal "jigs" used for metal furniture. Jigs and molds allow for replication of specific designs. They are also used in woodwork. The cost of the jigs shown above is estimated at Kshs 1 million.



A locally fabricated mould machine used to fabricate metal furniture ornaments seen below.



Jigs and moulds used in furniture production
Source: Field work, 2011.

Firewood and charcoal that were the preferred methods were not efficient. The older versions of the *jiko* (that was straight in design and was made from tin only) was considered wasteful in energy use. With the development of the prototype, standards were developed and published under the "Standards and Guidelines for Charcoal Stove Evaluation." Training ensued for purposes of dissemination and mass production.

The quality of the *jiko* lies in the adherence to the standards and supermarkets such as Nakumatt insist on the quality adherence. The most important part of the *jiko* is the liner because it is the part that absorbs the heat from the charcoal, creating the firebox temperature and creating the secondary source of heat for cooking. The artisans are encouraged to use recycled tin for production, thus incorporating elements of sustainability.

1. Overview of the project
2. Introduction to the project
3. The project's objectives
4. The project's methodology
5. The project's results

INTERVIEW GUIDE

APPENDIX II

1. How long have you been working for the organization?

2. What is your current role in the organization?

3. What is your experience with the project?

4. How do you think the project is going to be successful?

5. What are the main challenges you are facing in the project?

6. How do you think the project is going to be successful?

7. What are the main challenges you are facing in the project?

8. How do you think the project is going to be successful?

9. What are the main challenges you are facing in the project?

10. How do you think the project is going to be successful?

APPENDIX VIII

List of Apprentices interviewed

1. Amos Owiny
2. Jastus Musili
3. Tom Mutua
4. Antony Mbuvi
5. Isaac Muli
6. Onesmas Chanje
7. Tom Kavuluni
8. Moses Mutua
9. George Odhiambo
10. John Okumu

INTERVIEW GUIDE APPRENTICES

Date: Time: Name:

.....

Contact (Phone):

1. Home District:
2. How long have you been in Gikomba?
3. What is your highest level of education?
4. What are the THREE major things you have learnt sine you came to Gikomba?

.....
.....
.....

5. Why do you want to learn this trade (sofa making)?

.....
.....

6. How many more years do you want to stay as an apprentice?

.....

7. What are the TWO benefits of learning in Gikomba

.....
.....

8. Do you belong to any society or association? Yes/No.

9. If Yes, Please give the name (s).

.....

APPENDIX IX

Gikomba News

Often when Gikomba market has made news, it is because of fires. Almost every year, the market burns down and unfortunately the furniture makers suffer big losses because their site is difficult to penetrate into with fire engines. In 2009 the market burnt down in January (Biomndo 2009) causing the traders huge losses and September 2010 that same story hit the headlines, causing untold damage to the furniture industry there. Investigations as to why the market fires cannot be controlled have never revealed any substantial information. It is suspected that the fires are caused by arson attacks but so far no suspects have been arrested.

4 | National News

DAILY NATION
Thursday September 9, 2010

GOODS DESTROYED | Some 200 shops that include workshops, furniture and clothes stores ruined by afternoon inferno

Property worth millions razed in Gikomba fire

Crowding at popular market hampers bid to control blaze which raged for three hours

BY OLIVER MATHENGE

A fire broke out at Nairobi's Gikomba Market yesterday afternoon, destroying property worth millions of shillings.

It was not clear what started the blaze. The fire that raged for three hours was fought by City Council firefighters but their work was hampered by inaccessibility in the overcrowded market.

Nairobi Provincial Commissioner Ntiranga decried the difficulty of fighting disasters in some

parts of the city. He added that despite the speedy response by firefighters they were still faced with difficulties of accessing water.

The light industry area houses more than 200 shops that include work shops, hardware stores, furniture and clothes shops.

An estimated 50,000 people draw their source of income from the market which deals in second hand goods.

Witnesses said the fire may have been caused by an electric fault because bringing down electric poles that helped to fuel the flames.

Police had a hard time controlling the crowd that had gathered at the scene.

Last year, another fire destroyed goods worth thousands of shillings when the stores caught fire in the night.



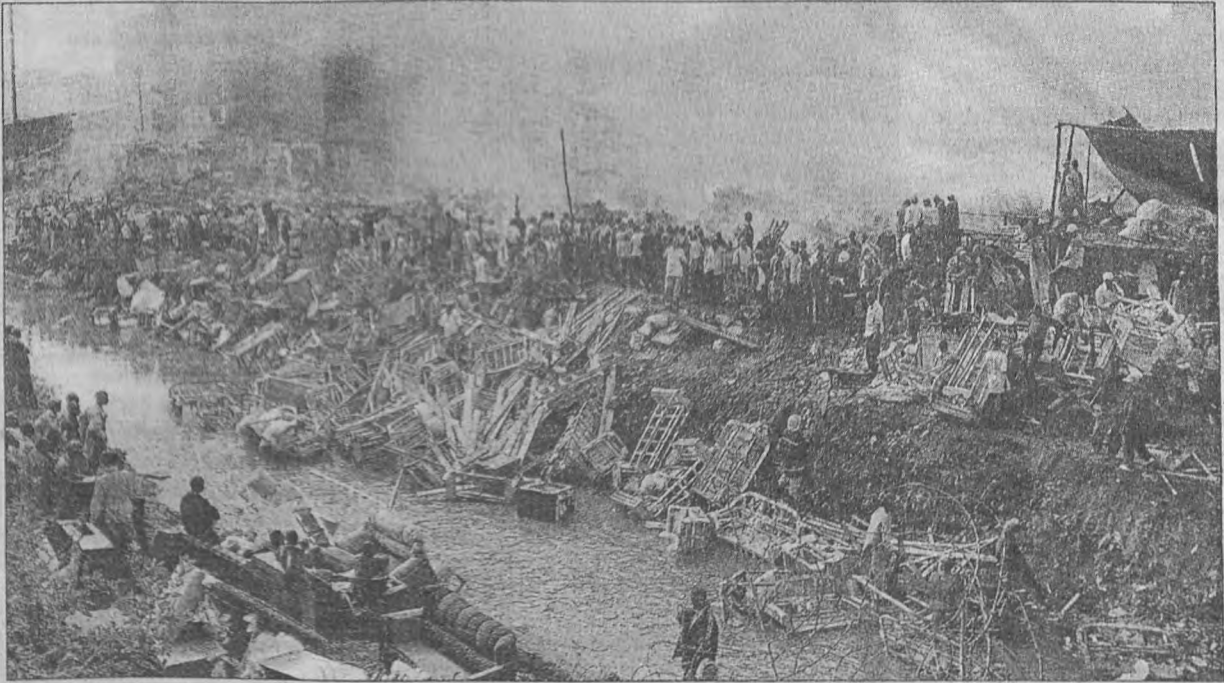
Above: A desperate trader uses a bucket to fight a huge blaze at Gikomba Market, Nairobi, yesterday. Below from left: Traders salvage whatever they could as the fire raged; a firefighter calls for reinforcements, and some traders carrying furniture to safety. The fire destroyed property worth millions of shillings.



Fire fighters fighting blazing fire that gutted stalls in Gikomba in this newspaper picture. Artisans can be seen ferrying their products to safe grounds.

Source: Mathenge Oliver, The Daily Nation, Thursday September 9, 2010. P.3.

Gikomba is burning!



In Nairobi's Gikomba Market you can buy anything from used clothes to sofa-sets. But yesterday when fire broke out, the traders threw whatever they could salvage into this dirty stream if only to save a little for tomorrow. Later, as firefighters navigated the mess, they stood by and watched. [PHOTO: BONIFACE OKENDO/STANDARD] SEE STORY PAGE 6

Sofa makers struggling to salvage their frames from a blazing fire in this picture taken in September 2010.

Source: The Standard. Thursday, September 9, 2010. P.4.

APPENDIX X

Japan's Tupon's Furniture

EXTERIORS

DAILY NATION
Thursday
October 14, 2010

Save space with a futon



The Japanese got it right when they invented this lovely, multi-purpose piece of furniture. Given the shape and size of most rented rooms in Kenya today, you have every reason to invest in one. You won't regret it!

BY CAROLINE NJERI
cnjeri@dailynationmedia.com

Before the rest of the world came up with beds of stone, hay and wood, the Japanese had already invented the futon.

Back then, the futon was a quilted, padded mattress laid on the floor and used mostly for sleeping. Today, the futon's use is not so limited.

The modern day version, for example, now has a frame of wood, metal or hard plastic, and can be converted into a sofa. Some even have wheels attached at the centre — where they fold — and at the far end — where the feet of the bed would be.

Others are just easy to fold in and out of the shape of a settee or couch. You can find it especially useful in small rooms where space is an issue. Folding the futon opens up the room, allowing space for up and down movement.

This usually very light, flexible piece of furniture could fit any room in the house. It is not only easy to carry around, but also quite easy to store when not in use.

It could be that extra sofa in the living room, that day bed on the front porch, or what kids use as a trapezoid in the back yard at playtime.

For it to be an outdoor piece of furniture, however, ensure that the material used

is resistant to weather. Polyacryl-coated canvas is one such material.

Depending on its shape and size, a futon could also be placed in the lounge of your house when you have loads of company.

A square futon, for example, could be used both as a table and as a sitting surface. You could place food and snacks at the centre of a futon while seating people all around its edges.

You could also simply use it as a table at the centre of your living room, surrounded by all your other furniture. That way, when the company leaves, you can fold it back up and reclaim your space.

With a combination of assorted pillows and cushions, futons can serve a multiplicity of other purposes, including as an ironing or folding surface, not forgetting as a bed for unexpected visitors... if you don't have a guest room.

In kids' rooms, futons are great whenever they have sleepovers with friends. They can roll it out into a bed at night and back into a sofa during high traffic times, like in the morning.

Futons are only now gaining popularity in Kenya and, needless to say, they may be just what we need, given our contractor's tendency to build chicken pens in the name of sitting rooms.



Source: Njeri Caroline, The Daily Nation- Thursday 14th October 2010.