DETERMINATION OF A SIZING SYSTEM FOR MASS CUSTOMISATION OF GHANAIAN WOMEN'S TRADITIONAL DRESS: AND A CONCEPTUAL FRAMEWORK FOR SMALL AND MEDIUM SCALE ENTERPRISES

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ABSTRACT

Dress whether traditional or contemporary is a visual symbol that communicates the identity of individuals and groups who share a common background and heritage. This study identified that the usage of traditional dress in the Ghanaian society functions as an important medium for social differentiation in terms of identity construction which is communicated through its symbolic meaning. Traditional dress for women, known as "slit and kaba", previously consists of two pieces of cloth and a semi-fitted blouse which requires no standardised sizing and fit requirements but as this dress has undergone an evolution process into a skirt and blouse with western features, the fit and manufacturing quality has become increasingly important. The usage of this dress for both formal and informal functions and its evolution places importance on its overall production strategy in terms of sizing, quality and fit.

The research was undertaken to develop a sizing system for the mass customisation of the Ghanaian traditional dress for women between the ages of 20-54 years old. In order to achieve the aim of the research, an extensive review of literature was conducted which led to the adoption of multiple data collection strategies in terms of participant observation, interview, questionnaire and an anthropometric survey to corroborate each other. The grounded theory approach was utilised in order to ascertain key issues related to mass customisation, production and utilisation of traditional dress while a quantitative approach was adopted to develop a sizing system for the Ghanaian woman and to establish the relationship between the meaning and utilisation of this dress. The data was collected in three metropolitan centres in Ghana from consumers and manufacturers of the traditional dress as well as the stakeholders of the garment industries using a non-probability purposive sampling technique. The quantitative results were analysed using correlation, a one-way ANOVA and t-test to determine the relationships among the variables while an inductive approach through the grounded theory was used to analyse the qualitative data. The findings were used to develop a conceptual framework for a sizing system regarding quality of fit and the utilisation as well as the development of a production model that facilitates the mass customisation of the Ghanaian traditional dress.

The findings revealed that the traditional dress has undergone a considerable change, and demographic factors, such as age, education and marital status are associated with its utilisation. The anthropometric survey confirmed that the average key dimensions (bust, waist and hip girths) of the sample are larger when compared with those of other studies conducted where the participants were of white ethnic origins. This has practical implications when producing garments for the Ghanaian consumer using other size charts from different target groups or surveys. In terms of a production strategy, the study showed that there is a strong preference for mass customisation over mass production as a result of issues with fit. This study provides the first anthropometric survey on the female population and has a great implication for the development of the Ghanaian clothing industry in the provision of well fitting and quality garments to promote consumer satisfaction. It also contributes to knowledge in the area of traditional clothing practices placing emphasis on the utilisation and the underlying meanings of the traditional dress within the socio-cultural context. This study therefore provides original baseline data for future research for the development of research-based national standards for menswear and childrenswear for Ghana in particular and West Africa in general.

Declaration

No Portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institution of learning.

Dedication

This Thesis is dedicated to the memory of my late father, John Kuma who believed in education for all; and to my husband Divine Kpobee for his endless support and belief in me; and my mother, Ellen and my siblings, Jessie, Jerry, Mike and Gabby.

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CHAPTER 1 Background to the Study

1.1 Introduction

Dress, whether traditional or contemporary, is used by individuals and groups to create meaning (Damhorst, 2005). In many societies, different patterns of dress emerged as human beings have found ways to develop available resources in order to satisfy their physical and socio-cultural needs. Four major theories have developed by academics and psychologists as to the origins of clothing which include the protection, modesty, adornment and the immodesty (Horn and Gurel, 1981) and although there are arguments about which preceded the other, one basic fact remained the same which is human beings have always dressed themselves. Dress was used to cover certain body parts that are considered intimate and also used to protect the body from harmful elements from the environment. Dress according to Roach-Higgins and Eicher (1992), is any modifications or supplements to the body. This includes items of direct modifications such as tattoo, body piercing, treated hair and supplements such as garments, jewellery and other accessories. The term dress is used interchangeably in literature with other words such as clothing, fashion, costume and garment.

Dress has been used extensively over the years among the various West African ethnic groups and although the uses and meanings vary there are some similarities. As a supplement and modification to the body, it is also a cultural symbol that communicates the identity of members of a particular group. In this regard, ethnic dress is defined by Eicher and Sumberg (1995, p. 299) as "ensembles and modifications of the body that capture the past and present of the members of a group, the items of tradition that are worn and displayed to signify cultural heritage". Most of these dresses have developed over time and have become traditional dresses that are used to distinguish one ethnic group from the other, even within the same country.

Since the introduction of mass production, sizing has been used as a tool to categorise consumers into standardised body and garment dimensions in order to facilitate the production and retailing of clothes (Beazley, 1997). This is necessary as size is related to the dimension of an individual's body, which is as a result of variation among people, involving generations, ethnic groups, sex and race among other factors (Le Pechoux and Ghosh, 2002; Winks, 1997). Anthropometry, according to the Oxford Advanced Learning Dictionary (2007) is defined as 'the measurement of the human body with the

view to determine its average dimension and the proportion of its parts, at different ages and in different races or classes'. Recently, several countries (UK, USA, and Japan) have recognised the need to conduct their own anthropometric surveys in order to provide well fitting garments for the population. This is in line with Otieno's (1999) view that styles can be globally desired but sizing should be local. However, there has always been the problem of variation in sizing among different manufacturers and confusion about how these sizes are labelled (Winks, 1997).

Generally, fit and sizing are interrelated as the fit of a garment is dependent on a sizing system that allows consumers to select appropriate garments that conform to their body forms. According to Chun-Yoon and Jasper (1996) and Ashdown (1998) the use of key dimensions is important in developing a framework for an anthropometric sizing system with body measurements for garments. Gupta and Gangadhar (2004) also found a strong correlation in four key dimensions (height, bust, waist and hip) of women in India and suggested these are critical in determining garment measurements and sizing systems. Although there are several national garment standards in use today worldwide, it appears that this has had minimal impact in Africa regarding the development of national sizing systems.

The development of several new technologies such as the 3-dimensional (3D) body scanners in the area of anthropometric measurements has promoted mass customisation in the apparel industry for consumers to personalise their garments for improved fit through the use of individual measurements. Pine (1993, p. 48) defined mass customisation as the mass production of individually customised goods and services. It has been identified from literature (Lee and Chen, 1999; Anderson- Connell, Ulrich and Brannon, 2002) that the use of adequate individual body measurements information is crucial in achieving fit in mass customisation of apparel as fit has become a key issue for most consumers. Mass customisation is therefore seen as a panacea for solving fit problems in the garment industry as the focus is on personalisation rather than standardisation. In view of this, several studies have been conducted to examine different aspects of mass customisation such as "Co-Design" (Ulrich, Anderson-Connell and Wu, 2003), Acceptance of Mass Customisation (Fiore, Lee, Kunz and Campbell, 2001) and 3D Body Scanning (Fiore, Lee and Kunz, 2004; Istook and Hwang, 2001).

This study investigates; the meaning of dress, utilisation of anthropometric data to determine a sizing system for mass customisation of Ghanaian traditional dress and

develops a conceptual framework for Small and Medium scale enterprises. Since the importance of the micro and small scale enterprises (SME) in sub-Saharan Africa is widely recognised as being significant in its economic development and suggests that about 30 percent of the working population are employed by these enterprises (Mensah, Tribe and Weiss, 2007). The role of this sector is considered as critical in promoting economic growth, generation of employment towards poverty reduction among urban cities in most developing countries (Kufuor, 2008) and ensuring equitable distribution of limited resources. Therefore, this study is essential for the future of the Ghanaian clothing industry in terms of the development of a manufacturing strategy that enhances the fit and quality of garments to promote consumer satisfaction.

1.2 Background Information on Ghana

Ghana, a country located in sub-Saharan Africa, 400 miles north of the equator has a population of about 20 million people. This West African nation lies on the Gulf of Guinea bordered on the east by Togo, west by the Ivory Coast, the north by Burkina Faso and the south by the Atlantic Ocean. The ancient kingdom of Ghana existed nearly 500 years before the arrival of the Europeans in the 1471 who later changed the name into the 'Gold Coast' as a result of the abundance of gold mines (Pierre, 2004). Ghana covers 92,100 square miles and may be divided into three distinct geographical regions: coastal plain, forests and savanna (tropical grassland with scattered shrubs and trees). The climate of Ghana is classified as warm tropical and humid which has two seasons of dry and rainy and average annual temperature of 26°C.

The population census of 2000 estimated the population of Ghana at about 20 million (Ghana Statistical Service, 2002) and stated a growth at a rate of 3 per cent per year. Ghana is divided into ten administrative regions namely Greater Accra, Ashanti, Western, Central, Eastern, Volta, Brong Ahafo, Northern, Upper East and Upper West regions (Appendix 11). The capital of Ghana is Accra in the Greater Accra region with a population of about 1.7 million and located along the coast. With regards to religion, over two-thirds of Ghanaians are Christians (68.8%); Islam (15.9%), traditional religions (8.5%) and the rest (6.1%) are not affiliated to any religion (Ghana Statistical Service, 2002).

Most of Ghana's ethnic groups (constituting the modern Ghana from oral history) are said to have settled in their present locations by the 16th Century. The Bureau of Ghana Languages classifies the ethnic groups in Ghana (Ghana Statistical Service, 2002) to include predominant groups such as Akan (49.1%), Mole Dagbon (16.5%), Ewe (12.7 %) and Ga-Dangme (8.0%). These major groupings may be further divided into numerous cultural and linguistic groups and sub-groups who share a common cultural heritage, history, language and origin. For instance, the Akan's may be further divided into Fante, Asante, Akwapim, Bono and Nzema among others. There are over 60 indigenous languages in Ghana which are spoken among the different ethnic groups although Akan is the most widely spoken. Most of these ethnic groups have their own culture in regards to traditional festivals and the rites of passage some of which are marked by specific types of traditional dresses (Ghana Statistical Service, 2002).

Although there are many forms of dress in Africa, the wraparound form is mainly used among most countries in West African and consists of two sets of rectangular piece of cloth with or without a blouse (two yards of each). These wrappers are called '*ntama*' and the blouse '*kaba*,' in Ghana with similar dresses also worn in neighbouring countries such as Togo, Nigeria and Benin. This can be attributed to the fact that some of the ethnic groups in Ghana from oral history are said to have migrated from these countries and might have brought this form of dress with them.

Ghana has a dual system of dress due to colonisation by the English and these are the traditional and western styled garments. Traditional garments are made in local designs and fabrics whereas western styled garments are made in western fabrics and designs. (See Appendix 1 for sample photographs of the traditional slit and Kaba). Women in Ghana continue to use traditional dress for formal and informal functions (Salm and Falola, 2002) alongside western styled garments. According to Arthur and Rowe (2001), the ways in which the wrappers are used may convey messages about the wearer's age, marital status, mood and social experiences. Traditionally, the blouse or '*kaba*' is made into simple loose or semi- fitted styles that hangs from the shoulders.

The different traditional dresses that are used in Ghana are shared among its people as a representation of social relations and ideology which are mostly reflected through the use of variety of traditional fabrics. The uses of these fabrics for clothing functions as a non-material culture and tend to symbolise the values and beliefs of the different ethnic

groups. They may express historical or cultural landmarks, philosophical concepts, political thoughts, religious and moral values of the society or current issues affecting the welfare of individuals. Traditional dress was also used to signify independence and political freedom from colonisation as demonstrated by some African leaders such as Kwame Nkrumah of Ghana and Azikiwe of Nigeria (Eicher and Sumberg, 1995) who used these dresses for official functions outside their respective countries.

It appears from observation that the traditional '*kaba*' and '*ntama*' have undergone a variety of changes in fit and form and some of these changes are generally attributed to the influence of western dress through social interactions, migrations and the media. Salm and Falola (2002) observed that African fashion has evolved into the combination of African and western fashions. The form of the *ntama* in this regard has evolved into a long ankle length skirt (known as the slit) with an opening to allow for movement. The 'kaba' on the other hand has been made into different forms of tailored blouses. Although the fit and form of the kaba and *ntama* has evolved over the years, the traditional fabrics that are used appear to have remained unchanged. According to Eicher and Sumberg (1995) the term traditional is seen to be static and reflects no change or few changes. However, some traditional dresses have undergone changes which appear to be the case of the Ghanaian slit and *kaba* and could be referred to as modern traditional dress in supporting the fact that culture is not static.

1.2.1 Overview of the Ghanaian Economy

The Ghanaian economy is considered as a transitional economy which is characterised by restructuring through privatisation at both macro-economic as well as micro-economic levels (Boohene, Sheridan and Kotey, 2008). Ghana operates a mixed economic system, the main sectors being estimated to be Agriculture (36.3%), Service (29.7%) and Industry (24.9%) in 2000 to 2005. The Ghanaian economy has maintained a relative high average growth rate of about 5.1% (2000-2005) which is driven mainly by agriculture (Institute of Statistical, Social and Economic Research, 2005) with a Gross Domestic Product (GDP) of 6.4% in 2007. The major income earners for the Ghanaian economy include cocoa, minerals such as gold and diamond and other primary goods (Rankin, Soderbom and Teal, 2002).

Due to the over-reliance on the production of primary goods and agriculture as well as the falling prices of cocoa on the world market, the economy took a downturn in the 1980's. In an attempt to reverse the trend, several programmes were launched such as the Economic Recovery Programme (ERP) in 1985 to improve the growth of the major sub-sectors of the economy (Fianu and Zentey, 2000) which failed to address the problems. In another attempt to rescue the economy, The National Development Planning Commission (NDPC) was established in 1990 to formulate a long term development policies towards the growth of the economy (NDPC, 1995). As a result the 'Ghana Vision 2020' framework was developed which stresses the need for the expansion of the private sector as an important element towards the accelerated growth of the economy. Among the economically viable private sector industries the policy developers identified was the textiles and garment industry as having a potential to make a significant impact on the national economic growth (Boohene, Sheridan and Kotey, 2008).

Currently, in another bid to promote economic growth, the government of Ghana launched an initiative called 'The Presidents Special Initiatives (PSI) which includes Garments and Textiles. The PSI initiative was launched in September 2001 as a partnership programme between the public and private sector which is designed to facilitate the growth of private sector of the economy (Kufour, 2008). The objective for implementing the PSI within the garments and textiles sectors in particular was to develop the garment industry to become a leading export sector which in turn becomes a primary source of employment creation in Ghana

1.2.2 The Ghanaian Textiles and Garment Manufacturing Sector

Garment production is seen as well suited for nations seeking economic development due to its labour intensity which is able to generate a considerable number of employments from the modest investment of capital (Zwane, Richards and Edmond, 2002). The textile and garment industry in Ghana is an important priority to the government in a bid to promote economic development and poverty alleviation through employment and revenue creation. In 1994, the revenue from garment export was valued at USD 0.157 million whiles between 1995 and 1997; the export figures increased to USD 1.12 million, (Ghana Export Bulletin, 1997) and accounted for 2.3 percent of the total value of non-traditional exports in the first half of 1997. The total

exports for textiles and garments in 1997 were USD 2.5 million, up from USD 1.9 million in 1996. This therefore implies that if the textiles and garment sector was supported, it has the potential to develop and promote the growth of the economy of Ghana.

Boateng (1996) estimated that garment manufacturing constitutes about 60% of the informal sector employment in the urban centres in Ghana. Chimieloweic (1995) in a UNIDO/ILO mission report stated that the total employment generated by garment and textiles firms is around 16.5%. It is therefore evident that the garment and textiles manufacturing sectors play an important role in employment generation towards the economic development in Ghana, as it equips individuals with the ability to cater for themselves as well as their dependants.

The garment sector in Ghana is largely made up of small-scale enterprises in the form of sole proprietorship found in the informal sector of the economy which produces for local markets although there are few large scale companies that produce for export. Historically, the production of slit and kaba has been custom-made by garment manufacturers in the micro and small scale enterprises (MSSE) of the informal sector (Fianu and Zentey, 2000).

According to Kufour (2008), the SME sector is characterised by low levels of education and training of the self employed in Ghana. It is known from past works (Fluitman, 1992; Anon. 2004; Liimatainen, 2004, World Bank SAR, 1993) that most dressmakers and tailors in Ghana acquired their skills through informal apprenticeships. The above authors suggest that this type of informal training appears to have insufficient theoretical foundations which may affect the quality of skills acquired. It is therefore not surprising that most employees trained through this system lack pattern making skills as the freehand cutting technique (method of cutting out patterns directly from the fabric) is mainly used (Fianu and Zentey, 2000). In addition, there appears to be a lack of creative abilities and good finishing techniques as this method of production make standardisation and mass production difficult as the technical expertise of the dressmaker greatly influences the fit and aesthetic qualities of dresses that are produced. This is even more compounded since the manufacture of garments is labour intensive and not automated.

Ampofo (2002) reported that there were 138 medium and large scale garment and textile industries producing ready-to-wear garments in Ghana in 1979 but this number had reduced to 72 by 1995. Most of these industries collapsed as a result of problems such as poor finishing of products, inability to meet export orders that are associated with mass production and lack of quality and conformity to standards. Hoefter (2001) however, is of the view that the problems of low productivity could be attributed to the lack of management skills by Ghanaians for larger firms as these firms are mainly managed by foreign expatriates. It also appears from the lack of relevant literature that the garment and textiles industry does not benefit much from research institutes in the areas of management, design or product development as done in advanced countries.

Hoefter (2001) is of the view that the demand for custom made garments has affected the development of the garment industry and with the absence of large scale production; there has never been standardised sizes in Ghana. As a result, no nationwide size survey has been conducted to categorise the body form of the citizens into size charts. However, as the slit and *kaba* takes more western features, the fit and quality of the garment has become more important. Considering the importance of slit and kaba in the daily clothing needs of Ghanaian women, it is essential that this dress is made more accessible to consumers through an effective sizing determination and a production system.

1.2.3 Context of the Current Study

The current study was to develop a sizing system for the mass customisation of the Ghanaian traditional dress and to promote it as a mass customised garment. As it is apparent that no anthropometric survey has been conducted in Ghana and currently, there is no conceptual framework on the utilisation and exploitation of body measurement data, it is important that a size chart be developed to facilitate large scale garment production. And considering the fact that the slit and kaba from observation might have undergone changes in fit and form, there is a need for a sizing system that provides a better fit through the development of a size chart. In addition, the study develops a conceptual framework for the utilisation of anthropometric data in order to streamline the production of the traditional dress to improve its fit and quality. Therefore, the development of a production model is paramount, regarding the

utilisation of anthropometric data that enables mass customisation of the traditional dress.

1.3 Objectives of the Study

The aim of the study is to analyse the evolution and utilisation of the Ghanaian women's traditional dress, evaluate the current production system in relation to fit and quality standards and to develop a sizing system that promotes it as a mass customised garment. The specific objectives are:

1. To evaluate Ghanaian women's attitudes towards traditional dress in relation to mass customisation.
2. To evaluate the current production methods regarding the management of anthropometric data within the local Small and Medium Scale Enterprises (SMEs) in relation to standardisation and mass customisation.
3. To formulate body measurement chart for Ghanaian women aged 20-54
4. To develop a conceptual framework for a sizing system regarding quality of fit and the utilisation of traditional dress in Ghana.
5. To develop a model of information flow that promotes the understanding of the utilisation of anthropometric data in relation to mass customisation in the development of the traditional dress.

1.4 Justification of the Study

This study has several important aspects which could form the basis for policy action for the improvement of the garment industry in Ghana especially in terms of garment production and the development of size chart for women's garments.

The SME sector has currently become an integral part of the government's effort to promote socio-economic development in Ghana and as a result significant research has been focused on this sector (Kufour, 2008; Mensah, Tribe and Weiss, 2007; Boohene, Sheridan and Kotey, 2008; Fening, Pesakovic and Amaria, 2008, Arthur, 2007). Kufour (2008) is of the view that SME's form the largest portion of the employment in both formal and informal sector in Ghana and are important in the private sector development although there is not sufficient data on their contribution to the countries GDP. Although, the slit and kaba is widely used in Ghana its research has received very

little attention by previous researchers which is revealed in the lack of existing literature regarding its utilisation and development. Therefore, this contributes literature regarding traditional dress in Ghana which is necessary for the development and preservation of the material culture in terms of the slit and kaba. Furthermore, this study is also unique in terms of the expansion of knowledge on women's body form categorisation for the development of a size chart which is critical for the production of well fitting garments for Ghanaian women. The development of this size chart would aid the facilitation of large scale garment manufacture and utilisation which is needed for the economic development of Ghana in terms of employment and revenue creations. The size chart data can also serve as a basis for further research in the development of other size charts for menswear as well as children's wear as there are no size charts available to the Ghanaian population.

The evaluation of the current production methods of the traditional dress can reveal the level of technology currently employed by the garment manufacturers and such findings could form the basis for the improvement and development of the garment sector in Ghana as a whole. This development is necessary if the garment industry is to become a major export sector of the economy as proposed by the President's Special Initiative (PSI) on garments and textiles. The development of an appropriate production strategy will facilitate garment production thereby enhancing the quality and standards of the garment sector in general. Not only will this facilitate the production of garments but also this will aid the development of a model of information flow on the utilisation of anthropometric data for the mass customisation of traditional dress and promote the development of a conceptual framework for a sizing system for SMEs in Ghana.

CHAPTER 2 Literature Review: Dress and Small/Medium Scale Enterprises

2.1 Introduction

The review of literature is divided into two chapters with the first part examining dress and Small/Medium Scale Enterprises (SMEs) and the second chapter focusing on anthropometrics and garment mass customisation. The first section of this chapter however, critically examined the meaning of dress in relation to the Symbolic Interactionist theories and defined Ghanaian dress within the socio-cultural context. The final section focused on the SMEs in relation to the Ghanaian economy.

2.2 Definitions of Dress

One way through which the body presents itself in society is through the use of dress. Eicher and Roach-Higgins (1992, p.15) defined dress as "an assemblage of body modifications and/or supplements displayed by a person in communicating with other human beings". Roach and Musa (1980 p.68) also observed that dress is "the total arrangement of all the outwardly detectable modifications of a person's body and all material objects added to it" which uses the term dress (noun). The term dress is also used as a verb which refers to the act of dressing or management of one's appearance. Hillestad (1980) is of the view that dress involves articles of clothing as well as articles of adornment whiles Horn and Gurel (1980) describes dress as a second skin in which the body serves as a vehicle of carrying around dress as the body is seldom seen without some form of dress. Arthur (1999) defines dress in the most global term to refer to all the ways through which the body is used in the expression of identity. In its broadest term, dress serves as a complex of signifying practices that touches on the very existence of the wearer. Entwistle (2000) refer to dress as "an activity of clothing the body with an aesthetic element" as in adornment.

All of these definitions suggest that dress has no definite definition but has multi-facets which may be viewed from different perspective depending on its context. Even though other terms such as clothing, fashion, adornment and appearance among others have been used interchangeably, Roach-Higgins and Eicher (1992) argue that the term dress is all-encompassing and may include aspects of the others.

2.3 Meanings of Dress

Dress serves many purposes one of which is to make "intangible meanings" concrete by serving as an agreement with the norms and values of a particular cultural group (Crane *et al*, 2004; Roach-Higgins and Eicher, 1992). Damhorst (2005) asserted that dress has meanings that are relative to culture and these are created by individuals as they live within the society and interact daily with the objects and materials of dress. The above author asserted that meanings of dress are created, maintained and modified by the individuals who wear these forms of dress which underlines the views of the Symbolic Interactionists' perspective in understanding the meaning of dress. Barnard (2002) on the other hand suggest that meaning may stem from two sources; meaning as external or outside the garment and as internal or inside the garment. He explained that meaning external to the garment may be generated from an external source such as the intentions of the designer or the wearer whereas meaning located in the garment may be from the garment itself or the elements from which the garment is made such as textures, colours and shapes. He further explained the meanings involving the garment 'itself' is 'in' the item and somehow inheres in the elements of design. Roach-Higgins and Eicher (1992) concurs that meanings communicated by dress may be a result of its basic form such as colour and shape. However, Davis (1992) referred to meaning as the "images, thoughts, sentiments and sensibilities communicated by a new or old fashion and the symbolic nature by which it is done" (Davis, 1982 cited in Davis, in 1992 p.4). From Davis's point of view, meaning is a product of the inner self which is communicated outwardly through a material item such as clothing and these meanings are cultural. In order to critically examine and understand meanings of dress as pertains to this study. Geertz (1973) suggested that the cultural analysis of dress should entail an interpretive process in search of meaning that can be intelligently described.

2.4 Symbolic Interaction Theory

The Symbolic-Interactionists perspective has motivated a lot of research stemming mainly from the theoretical insight of Stone (1962) on appearance and the self and Blumer (1969). Symbolic interaction is founded on 'root images' as Blumer (1969:6) labels concepts such as human groups, social interaction, objects, the actor, action and interconnection between actions. Blumer (1969) asserts that meaning is a social product

which is realised through social interaction with others. The premise of symbolic Interactionism are that:

.... '(firstly) human beings act toward things on the basis of the meaning that the things hold for them.

....(secondly) the meaning of such things is derived from, or arises out of, the social interaction that one has with others.

.... (thirdly) these meanings are handled in, and modified through, an interpretative process used by the person in dealing with the things he encounters' (Blumer 1969, p.2).

Blumer (1969, p.2) further emphasised that the third premises is significant in symbolic interaction by identifying that 'meanings are established by the actor and occurs through the process of interpretation'. This perspective provides one of the very useful ways of discussing meaning and interaction as a means of understanding social life and the communicative process. Although the basic principle underlying the symbolic interaction is abstract, the explanation of its connection with human communication is useful. Another fundamental pillar in symbolic interaction is the use of objects to create meaning in the interaction process. In order to understand a society, it is important to identify the world of objects and the meanings that are assigned to these objects within that society. Based on the above assumptions, the Symbolic Interactionists pursues the study of social actions and objects through communication.

2.4.1 Dress and Symbolic Interactionists Theory

This section examines dress from the symbolic interaction perspective as a medium of communication and uses this approach to examine its social meaning. Roach and Musa (1980) argue that the basic function of dress is communication as meaning is essential in human action and interaction. Stone cited in Kaiser (2002) expanded the Interactionists theory beyond discourse to include non-verbal communication through appearance which is made up of dress as well as gestures. The above author noted that because dress is often seen in social interaction before discourse it has the advantage in the establishment of identity. Kaiser (2002) further outlined the basic assumptions that underlines the Symbolic Interactionists perspective in relation to the study of clothing and appearance and asserts that this perspective deals with appearance management and perception as a two-way interaction which uses the term meaning instead of

information. According to Kaiser the basic assumptions underlying appearance in relation to Symbolic Interaction perspective are as follows:

... '(Firstly) humans create their own realities, in part, by managing their appearances;

.... (secondly) to fit their lines of action together, people use symbols;

.... (thirdly) we act toward other people, in part, on the basis of the meaning their appearance hold for us;

.... (finally) meanings assigned to clothing and appearance are manipulated and modified through interpretative processes. These basic assumptions, especially the third and the final can be traced to Blumer's (1969) premises on Symbolic Interactionism and focus on the meaning of objects, their interpretation and social actions'.

From this background it is important that in order to understand the meaning of dress as a medium of communication one must relate it to social interactions as appearance is socially constructed. The social meaning of dress therefore requires knowledge of the relationship between the cultural setting and the individual as dress has meaning only within the society in which it emerges (Roach and Eicher, 1973).

Dress has a dual function as a tangible object and at the same time as a sign or code embodied with social meaning and its use fulfils specific functions within that society. This is against the background that individuals assign meaning to appearance as a function of social interaction and these meanings are derived from observation and interpretation. According to Rabine (2002) dress as a symbol may reflect the status of the wearer and as a sign, it signifies fashion system of 'in' or 'out' of fashion. Dress as a visual supplement and/or modification to the body also serves as a means of communication and according to Gregory Stone cited in Damhorst (2005) considerable meanings such as identity, value, mood and attitude could be communicated at the same time through dress. Kaiser (2002) concur that dress as a visual object has the ability to convey nonverbal messages about the wearer in a given social interaction. Roach-Higgins and Eicher (1992) further explained that a particular type of dress is able to communicate numerous messages such as age, gender, social class, school affiliation or religion among others. Roach-Higgins and Eicher (1992) observed that the meanings communicated by dress may stem from its type and physical properties and as a result the dressed body may convey information about the wearer some of which may be intentional and others unintentional. Davis (1992) also asserts that clothing is a visual language that is full of codes that communicate something about the wearer and these

codes consists of the design elements such as fabric, texture, colour, pattern and other expressive elements of a given culture.

2.5 Dress and Culture

The term culture has different definitions based on the context from which it is examined. Culture may be defined as a structure of feeling, set of shared artefacts and understanding; what people know, feel, think, make, and do; the whole way of life of the members of a society which includes their dress, marriage customs and family life, their patterns of work, religious ceremonies and leisure pursuits (Kaiser, 2002 ;Giddens, 1989; Spradley, 1972). On the other hand, Horn and Gurel (1981) viewed culture as "the beliefs and customs of all people, educated or uneducated". The diversity of these definitions suggests the multi-facet nature of this concept although the characteristics or components remain similar. The characteristics of culture found in the literature suggest that it is shared, learnt, transmitted and transformed or adaptive (Kaiser, 2002; Giddens, 1989; Horn and Gurel, 1981) which posit the concept as a process which requires an effort by the individual. According to Geert (1991) culture is learned and cannot be inherited as it is not derived from one's genes. Jenks (2005) is of the view that the symbolic representation that constitutes the various grouping and classifications are cultural manifestations that provides unifications of the world through time and space. The two types of culture that has been identified include the material and non-material culture; material culture involves all objects that a society produces and uses whiles non-material culture relates to all the intangible of a society such as the beliefs, values, norms and language (Eicher, Evenson and Lutz, 2000).

Dress is considered as a material culture and used as a symbol of agreement with the norms and values of a cultural group (Roach-Higgins and Eicher, 1992) in which the agreement is visually represented by wearing dress as prescribed by that culture. The study of dress from the cultural perspective therefore relates to the focus of cultural objects and their relation to the belief systems (Kaiser, 2002) and is viewed in a context within which people experience and evaluate their lives. In order to understand dress from this perspective, it is suggested that a holistic approach be adopted in which all aspects of a culture are considered as shaping the meanings of dress and the choices individuals make in selecting appropriate forms of dress (Damhorst, 2005). Horn and Gurel (1981) emphasised that the primary influence of a type of dress worn by individuals in a society is dictated by culture.

Past research suggest the use of traditional/ethnic dress as a cultural symbol (Hamilton, 1991; Eicher and Sumberg, 1995) which has meaning (Crane et al, 2004; Damhorst, 2005; Barnard, 2002; Roach-Higgins and Eicher, 1992) and mediates between the individual and culture (Hamilton and Hamilton, 1989). Dress at the same time communicates non-material culture, as the way individuals are dressed and the meanings assigned to these items reflect their cultural beliefs about the ideals of dress and symbolic values within the society (Eicher, Evenson and Lutz, 2000). Dress at the same time is considered as a visible manifestation of cultural values and norms as the social functions of dress serves as a means of communicating individual or social standards and its use may fulfil several functions within the society.

In this regard, Hamilton (1991) observes that "dress as a cultural symbol serves as an indicator of group membership" (p.131) and Michelman (2005, p.66) is also of the view that dress in all cultures is unique and plays a critical role as 'the way we dress are a medium of culture, a powerful symbolic form'. In many societies there are dress practices that an individual has to conform to in order to be identified and accepted as a member of that group. Eicher, (1995, p. 4) concurs that identifying with one's culture gives a sense of belonging as the use of ethnic dress "helps to position an individual in time and place relationships". In conforming to the dress practices of the society, an individual is performing an important function of culture which is that it is 'shared' among members of that culture. Kaiser (2002) is of the view that within group life meaningful artefacts and traditions emerges which are shared and developed over a period of time. This aspect of sharing mutual interests and artefacts gives the individual a sense of belonging and results in interconnectedness among the group.

2.6 Traditional verses Contemporary Dress

The term traditional is used to connote lack of change or sometimes refer to primitive and static to change. Contemporary dress as defined by Forney and Rabolt (1985-1986) as that which is worn by individuals in today's society. Dresses, other than western dress are often called tribal, costume, native, traditional, ethnic, indigenous or authentic which include dresses such as *boubou*, robes, raffia skirts, kaftans, slit and *kaba* whilst ethnic dress is also referred to as traditional, folk, peasant or tribal (Rovine,2004; Eicher and Sumberg, 1995). These dresses are associated with local cultures and traditions

whereas western dress on the other hand is defined as fashion and characterized by change (Rovine, 2004). The Oxford English dictionary (2007) defined traditional as "a long established generally accepted custom or method of procedure having almost the force of law". The concept of tradition thus when applied to dress may imply non-fashionable dress that reflects the past and is considered to be slow to change and few modernising influences (Eicher and Sumberg, 1995).

In this regard, Lynch (1999) studied traditional New Year's dress usage among the Hmong Americans and identified three versions as the treasure-box traditional, old-style traditional and the new-style traditional dresses. She described the treasure-box traditional dress as mainly worn by older relatives in Liao and made up of dress elements that are consciously selected and based upon old prototypes. The old-style traditional is made up of relatively conservative trims that have formal linkages to with the past. Finally, the new-style traditional is described as generally characterised with openness to American influences which is largely preferred by the youth. She concluded that the younger respondents preference for the new-style traditional dress. It is evident from this study that traditional dress may undergo changes if used alongside other forms of dress.

Matthews (1979) categorised the traditional slit and kaba of Ghana into three groups namely; traditional, modified traditional, combined traditional and western dress. She described the traditional as a four-piece dress which include two sets of wrappers, a kaba and a head cloth. The modified traditional dress is described as including the slit, Kaba and the cover cloth and the combined traditional dress includes two sets of wrappers, western type blouse and a scarf. These descriptions suggest that there are varieties of the traditional dress based on its form and composition.

However, it is evident from the literature that there seem to be the dual usage of both traditional and contemporary dress forms among certain cultures which sometimes result in the hybrid of dress forms. Maynard (2004) suggest that the consumption of western clothing among certain cultures is seen as a sign of progress as opposed to clinging on to traditions.

2.7 Traditional Dress in Ghana

Dogbe (2003) suggest that the use of the slit and kaba in Ghana involves an intricate set of practices which include cultural beliefs, fashion trends and change in consumption patterns. There are varieties of traditional dresses worn by men and women in Ghana today which depends on one's ethnic background. Some of these traditional dresses are not worn as daily clothing but are only used during cultural festivals, rituals and during rites of passage. The traditional dresses include the slit and kaba and boubou for women and *batakari* (smock), *fugu* or *agbada* and cloth used in the form of classic toga by men (Salm and Falola, 2002). But the most widely used across all ethnic groups by women is the traditional slit and kaba; a-three-piece dress ensemble.

Traditionally these comprise of two sets of sarong-like wrappers or '*ntama*' (cloth) one of which is used for the lower section of the body, the other which is referred to as the cover cloth may be used as a shawl, tied around the hips or used as a head tie and a tailored blouse called kaba (Dogbe, 2003; Salm and Falola, 2002; Littrel, 1980). According to Salm and Falola (2002) the slit and kaba ensemble is thought to be an adaptation of the traditional one or two-piece wrapper used by women before contact with European traders and colonizers (See Appendix 1 for sample photographs of the traditional slit and Kaba).

It is believed that the Ghanaian slit and kaba intertwine tradition and modernity (Dogbe, 2003; Salm and Falola, 2002) as the fabrics that are used for this dress are mostly local or indigenous such as wax prints and hand woven *kente* which appears not to have undergone much changes over the years.

2.7.1 Fabrics and the Traditional Dress

Cloth in cultural context serves basic needs such as clothing, defines ones ethnicity, and social status and acts as a measure of value (Perani and Wolff, 1999). At the same time cloth a material culture serves as a mediator of cultural meaning at both individual and societal levels. According to Perani and Wolff, (1999), cloth is the most important two-dimensional art form in Africa and through decoration with pattern and colour carries a symbolic message.

A clear distinct feature of the slit and kaba established from the literature (Dogbe, 2003; Salm and Falola, 2002; Littrel, 1980; Matthews, 1979) is that, it is mainly made in local traditional fabrics such as the ceremonial hand woven kente, expensive wax prints, inexpensive fancy fabrics, or, hand-dyed batik and tie and dye and hand woven Yoruba *Aso-Oke*. Littrel (1980) conducted a study on the Ghanaian clothing selection and found that the most preferred and widely used fabric for the slit and kaba is the wax print and the very expensive ones such as the Dutch prints are considered as a prestige fabrics. She concluded from her research that wax print consumption is deeply embedded in the Ghanaian culture and mature women tend to utilise this fabric more than the younger respondents. She also found out that the majority of respondents in her study continued to use their old traditional dresses, as the traditional motifs in the fabrics are acceptable for many years.

The uses of local traditional fabrics are considered to be very symbolic in Ghana as the fabrics used for slit and kaba communicate messages about the wearer. Like a piece of artwork, every local traditional fabric especially kente, *adinkra* and wax prints are given symbolic names (Dogbe, 2003; Littrel, 1980). According to Arthur and Rowe (2001) the naming of wax-printed cloth dates back to the eighteenth and nineteenth centuries when Dutch and English wax prints manufacturers cultivated the West African markets. Such names may express the wearers, economic status, wealth, marital status, political affiliations and also express the mood of the wearer. The symbolic value placed on a particular cloth may make it more expensive than the others as in the case of kente cloth which is associated with royalty, prestige and leadership status (Dogbe, 2003). Design names may denote local proverbs, recall cultural or historical meanings, speak specifically of women's issues or make direct political statements. A design name such as *'o adeka eyi'* (in *Ga* language means 'your trunk/suitcase is full') denotes excess wealth.

2.8 Traditional Dress and Identity Construction in Ghana

Roach and Musa (1980) are of the view that one basic function of dress is communication and Roach-Higgins and Eicher (1992; Eicher and Erekosima, 1995) concur that the social functions of dress is its use in the establishment of identity by individuals. Roach-Higgins and Eicher (1992) explained further that a particular type of dress is able to communicate numerous messages such as age, gender, social class, school affiliation or religion. From the above viewpoint, it is clear that individuals' use the clothed body as a vehicle to carry around their identities and Stone (1962) concurs

and explained that considerable meanings such as identity, value, mood and attitude could be communicated through dress.

Social identity in relation to dress is expressed through form and function and defines who one is and where that person is in relation to a particular society. Social identity is explained by Davis (1992, p.16) as 'any aspect of self which individuals can through symbolic means communicate with others, in the instance of dress through predominantly non-discursive visual, tactile and olfactory symbols'. An individual may have several identities based on the social positions and roles that one need to play within the society and as a result dress may be used to facilitate such roles. According to the symbolic Interactionists' perspective, individuals acquire identities through social interactions and biological settings and this perspective is important in the understanding of status. However, Status is most often used in relation to economic terms although there are other forms.

Ethnic dress includes 'those items, ensembles and modifications of the body that capture the past of the members of the group, the items of tradition that are worn and displayed to signify cultural heritage' (Eicher and Sumberg, 1995, p. 299). These authors further explained that dress is often a significant mark of ethnicity used to communicate group membership and identity. From the above definition it is evident that ethnic dress is used as a symbol in communicating ones identity and represents the collection of dress that is made available to individuals in any social group, for example the American dress. Individuals obtain identities through social interaction from the physical as well as the biological settings. The above authors' further explained that ethnicity connects to the preservation of identity for individuals which links to a meaningful heritage. Identities assigned at birth include sex, race, body variations and ethnic category of kingship group and those acquired on the basis of social positions or roles. Social structures within any social group may include kinship, economic, religious and political activities (Roach-Higgins and Eicher, 1992). Forney and Rabolt (1985-1986) asserts that ethnic identity is not static but is developed and redefined over a period of time which includes attitude, values, shared experiences among others. Davis (1992, p.16) views social identity as 'any aspect of self which individuals can through symbolic means communicate with others, in the instance of dress through predominantly non-discursive visual, tactile and olfactory symbols'.

Dress as a physical object provides social communication of the individuals' status in a given society and may be used to announce various identities through kinship such as

family or clan identity among others. Ethnic identity as defined by De Vos and Romanucci-Ross cited in Eicher and Sumberg (1995 p.363) is 'a past-oriented form of identity, embedded in cultural heritage of the individual or group...(that) contrasts with a sense of belonging, linked with citizenship within a political state, or present-oriented affiliations to specific groups demanding professional, occupational or class loyalties'.

According to Dogbe (2003) a type of slit and kaba ensemble can communicate a range of messages about the wearer especially the cover-cloth which has a variety of uses. Historically the cover-cloth or the second wrapper or cloth may be used for a head tie, may be draped on the shoulders as a shawl or used to strap a baby to the back. The cover-cloth can also be folded and tied around the hips to emphasise its fullness and the placement of the knot whether to the front, back or to the sides may communicate the age or marital status of the wearer.

Dress may be used to communicate national identities (Dogbe, 2003) as well. National identity is defined by Cui and Adams (2002) as 'the extent to which a given culture recognises and identifies with a set of focal elements that set it apart from others...' (p. 638). In this regard, dress may be used to differentiate nations for instance, a Ghanaian from a Nigerian and in certain cases countries may set aside a particular type of dress that may be used as a national dress. The use of such dress may be to foster unity and to create national identity through which the citizens can relate to. Maynard (2004) asserted that most developing countries set aside a particular type of dress that best symbolise their cultural character and traditions which is used as their national dress and therefore represents their identity as a nation. For instance, in Ghana today, the hand woven kente fabric has become the accepted symbol in defining Ghanaian identity both within the country and on the international scene. Similarly in maintaining a strong sense of nationalism, politicians have called for the use of appropriate dresses that represent their national status in countries like Kenya and Uganda where there are no national dresses (Maynard, 2004).

Wearing or owning a traditional dress can also be an expression of ethnic identity (Dogbe, 2003). According to Salm and Falola (2002) traditional dress in Ghana is used to communicate regional and ethnic identity as well as national ideas. Dogbe (2003) explained that the use of slit and kaba at the group level has become a channel of expressing gender, ethnic, nationalist as well as class affiliations. Maynard (2004) noted the Ghanaians immigrants who live in the United Kingdom and are not yet British citizens continue to use and identify with traditional African wax prints which are

bought from West African shops and sometimes sent home as gifts instead of English items. The above implies that individuals do not only identify with their countries whiles within but may continue to do so even outside in order to maintain a link to their roots.

Dogbe (2003) agreed to the above viewpoint and explained that the use of slit and kaba has become a channel of expressing gender, ethnic, nationalist as well as class affiliations. In a bid to promote national identity, the government of Ghana through the Presidents Special Initiative (PSI) launched the 'Friday wear' for uniformed formal workers to wear traditional garments to work (Anon. 2006) to promote Ghanaian dress, fabrics and the textile and garment industries. Jun *et al.* (1993) suggests that consumers who maintain cultural identity with a traditional culture may seek items such as garments with symbolic meanings.

Cui and Adams (2002) observed that national heritage is defined by its importance and is related to historical figures and events which is a characteristic of national identity. However dress as a product of material culture may also be used to symbolise heritage and as a result may be preserved. The use of ethnic dress therefore underpins the significance of dress as a heritage artefact and visually represents the beliefs and practices of that culture (Eicher and Sumberg, 1995).

2.9 Functions of Traditional Dress in Ghana

It has been previously acknowledged in Section 2.4.1 that dress as a symbol has the capability to give information about the wearer in a non-verbal way and thus help in facilitating the meaning and function of a particular dress. The functions of traditional dress in Ghana are very symbolic and represent acceptable values and norms of the society and serve various functions such as practical, aesthetic, ritual and magical functions (Salm and Falola, 2002). In this regard, colour symbolism is one of the important aspects in the functions of traditional dress as it relates to the social status as well as depicts the mood of the wearer since specific colours are worn for different occasions. In Ghana, the colour gold signifies status, yellow (vitality), green (renewal and fertility), blue (spiritual purity), and red, black and brown (grief). White on the other hand may be used for any joyous occasion such as weddings, traditional marriages, naming ceremonies and funerals if the deceased has lived a long fulfilling life (ibid, p. 118). The social functions of the traditional slit and kaba can not be over

emphasised as this dress plays a significant role in the performing of birth, marriage, funeral and religious rites. Motifs in the cloths are also very symbolic and may be in the form of local, religious, educative or political symbols from which the names and purpose of the cloths are derived.

2.9.1 Birth Rites

In every society there is joy when a new member is added onto the family. This fulfils the biblical function of procreation as stated in the holy bible 'then God blessed them, and God said to them, be fruitful and multiply; fill the earth and subdue it' (Genesis1:28a). In Ghana, naming ceremonies are birth rites that are performed when a child is born and is done in accordance with the customs of one's ethnic background. This ceremony is performed to officially introduce the child to the members of the extended family and well wishers and also to name that child. As a traditional function, women usually wear white cloth in a form of slit and kaba and the men would also drape white cloth over their shoulders in the form of the classic toga which is a traditional dress for men in Ghana. White is used in a symbolic way to signify joy and victory (Salm and Falola, 2002).

2.9.2 Traditional Marriage Rites

Marriage is an important occasions in the life every woman in all societies. Among all ethnic groups in Ghana traditional marriage rites are performed and bride prices are paid which also depends on the bride's ethnic background. This includes a minimum of six half-piece cloths of wax prints as part of the bride price and also to show appreciation for the bride's beauty and hope in her reproductive potential. This is because traditionally, the three-piece slit and kaba ensemble is worn by married women whereas a two-piece ensemble on the other hand is worn by young women who have not yet attained the marriage age. According to Salm and Falola (2002), a typical Ga traditional wedding is called a 'six-cloth' marriage representing the quantity of cloth that must be given as part of the bride wealth requirements. Cloth *(ntama)* plays a very significant role in marriages in Ghana and has value beyond economic wealth. In a symbolic way, a man buys cloth for his wife as a sign of appreciation for her services as a woman and also to indicate that he is responsible and able to provide for his family.

2.9.3 Funeral Rites

Funerals have become one of the most attended social functions in Ghana today where people show off their wealth in the form of expensive cloths in trendy designs (Salm and Falola, 2002). It is believed that if a fitting burial is not given, the deceased may hunt the rest of the family as a result funerals are important in the Ghanaian culture. In the Ghanaian tradition, it is an unacceptable practice for a Ghanaian woman to attend a funeral in a western styled dress as this occasion is considered a typical traditional function (Dogbe, 2003). It is therefore popular to see women in slit and kaba on weekends as funerals are mostly held on Fridays or Saturdays. During these occasions, it is also popular to see close families of the deceased wearing the same cloth which signifies kinship or family identity.

2.9.4 Religious Rites

Ghanaians attach a lot of importance to religion as about 60% of the total population are Christians with the other 40% divided among Moslems and other African traditional religions. Traditional dress is used mostly during religious functions which again signify group affiliation and churches and other religious organisations sometimes commission a cloth for its anniversary for which women may use for slit and kaba. It is also popular to see women wearing slit and kaba to church on Sundays (Matthews, 1979) especially those who work in the formal sector and do not have the opportunity of wearing slit and kaba to work.

2.10 Traditional Dress and Western Fashion Change

Dress as a material culture reflects change or stability in a society's non-material aspects of life. Although the traditional cloth that is used for the slit and kaba might not have changed much over the years, dress designs or styles on the other hand have changed considerably according to fashion trends from observation. The wrapper has been transformed over the years into a tailored skirt frequently reflecting fashion trends from straight, flared, pleated to embroidered hem lines. According to Salm and Falola (2002) traditional dress and western dress are interrelated and Ghanaian fashion like western fashion is always undergoing change. Salm and Falola (2002) observed that African fashion has evolved into the combination of African and western fashions. Style choices are normally based on individual tastes and preferences as well as current

fashion trends. The symbolic and economic values placed on a particular cloth determine the style into which the cloth may be transformed. Expensive wax prints such as the Dutch wax and hand woven kente are normally tailored into classic styles that do not go out of fashion in order to preserve the cloth. Inexpensive fancy cloths however are tailored into trendy styles that often go out of fashion (Dogbe, 2003).

Matthews (1979) in a study on the traditionalism of dress and social values of Ghanaian women used the variables of age and education in relation to the utilisation of the traditional and western dress. She found that the age and education of the respondents significantly influenced the utilisation of both the traditional and western dresses respectively. She observed the younger respondents preference for the modified traditional which was used mainly for church and the use of western dresses for other social occasion. She concluded that the older respondents wore more traditional dress than western dresses for most occasions. These findings are important in understanding the changes that have taken place within the Ghanaian society over the years and underpins the influence of westernisation.

2.11 Traditional Dress and Women's Body Form in Ghana

Hillestad (1980) observed that the body appears in a variety of forms as a result of environmental conditions, geographical barriers, climate, and attitudes toward nutrition, grooming and concepts of ideal beauty. Genetic predisposition may also be responsible for many variations in the body form but cultural body ideals may be the result of achieved variations. In appearance the body operates as a base for carrying and giving aesthetic expressions to dress (Rudd and Lennon, 1994; Hillestad, 1980). According to Dogbe (2003) Africans for centuries have used their bodies as canvases for painting and wearing their identities, religious beliefs, histories and art.

Roach and Eicher (1973) explains that the ideal body form varies from society to society and is culturally constructed and may change with time. Content analysis of a variety of media over 20 years by western orientated researchers give an indication of what is accepted as the ideal body type in the western world, namely a well-proportioned but relatively thin body shape (Garner, Garfinkel, Schartz and Thompson, 1980; Morris, Cooper and Cooper, 1989; Silverstein, Perdne, Peterson and Kelly, 1986). In contrast to the western viewpoint, the ideal body form in certain African cultures in

Africa varies sharply. In Ghana for instance, Antuban (cited in Roach and Eicher, 1973) describes the Ghanaian ideals for female beauty as consisting of egg-shaped ovals. The head is expected to look like an egg with the widest part at the top. The torso must have two egg-shaped ovals with the widest parts at the shoulders and the hip areas, creating a well indented waistline. Large well rounded hips are considered beautiful and desirable. The same body ideal appears to operate in the South African context as the layered skirt of the Shangane's emphasises the importance attached to large hips (Kuma, 1999). Ford and Beach (cited in Garner et al, 1980) concur to the view that in certain African societies plumpness in female is considered attractive and in some cultures, obesity has been admired or even considered as a secondary sexual characteristic. Aghekhan, et al., (2005) supports the views that plumpness in certain developing countries is linked to high social status, health and wealth and therefore desired and considered to be the ideal body form. In terms of dress usage, the Ghanaian slit and kaba also tend to emphasise the rounded hips that are considered as ideal and in this regard the slit is always fitted at the hip. Because plumpness is admired especially in married women as a sign of economic well-being, most of the kaba designs are made with wide necklines to emphasise the neck and jewelleries worn around it (Salm and Falola, 2002).

2.12 The SMEs and the Informal Sector

Storey (1994) is of the view that small firms no matter how they are defined constitute the bulk of enterprises in all economies in the world. It has been established from other studies that small, medium and micro scale enterprises create jobs, generate wealth and reduce poverty in most economies (Kayanula and Quartey, 2000; Steel and Webster, 1992) and are seen as the engine of growth for many developing countries. It is estimated that SMEs employ 22% of the adult population in developing countries (Kufour, 2008) and the situation is not different in Ghana as it is estimated that 90% of manufacturing employment and 25% of value-added is provided by this sector. In recognition of the importance of the SMEs in Ghana, the Government established the National Board for Small Scale Industries (NBSSI) to promote and develop this sector (Adu-Amankwah, 2002) because of its contribution to national development and poverty alleviation.

It is estimated that the bulk of most manufacturing enterprises in Africa are mainly self employment with less than ten workers and the situation is not different in Ghana (Steel and Webster, 1992; Sowa et al. 1992). In Ghana for instance, most of the SMEs in the manufacturing sector are informal in nature and Adu-Amankwah (2002) described this sector as those concerned with the production of primary commodities, and are self employed under traditional or informal arrangements. Fidler and Webster on the other hand defined the informal sector as very small enterprises that 'use low technology methods of production and management' (1996). This definition although captures some of the key characteristics of the informal sector which is usually small do not necessary lack the other aspects as suggest by the above authors.

Although, the size of Ghana's informal sector is not really known it is estimated at around 80 percent and continues to increase due to the retrenchments in the public as well as the private formal sector. Barwa (1995) suggest that the informal sector in Ghana is important in alleviating large scale poverty in the urban centres in Ghana and continues to be the most single source of employment for about 60 percent of non-agricultural as compared to 15.6 percent of the formal sector. Adu-Amankwah (2002) however, placed waged informal sector employment at 16.1 percent of Ghana's labour force. This shows the importance of the informal sector of the economy in Ghana.

2.13 Definition and Concepts of Small/Medium Enterprises

Storey (1994) is of the view that there is no single, uniformly acceptable definition of small firms as they differ in their levels of capitalism, sales and employment. This is because definitions which use a measure of size (number of employees, turnover, profitability and net worth) among others when applied to one sector could lead to all firms being classified as small, while the same size in a different sector could lead to a different result. As a result, there are many definitions for SMEs by different organisations, such as the World Bank, United Nations Industrial Development Organisation (UNIDO), the International Labour Organisation (ILO) as well as country definitions (Kayanula and Quartey, 2000). Some organisations further have different definitions for developed and developing countries. For instance UNIDO's definition for developing countries such as Ghana which is based on the number of employees is as follows;

1. Large – firms with 100 or more workers

2. Medium – firms with 20 – 99 workers
3. Small – firms with 5 – 19 workers
4. Micro – firms with less than 5 workers.

The European Commission also defines SME and disaggregated the firms into three components as follows:-

1. Micro – enterprises with between 0 – 9 employees;
2. Small – enterprises with between 10 – 99 employees;
3. Medium – enterprises with between 100 – 499 employees.

The Ghana Statistical Service (GSS) also defines company size by the number of employees for instance, in its industrial statistics considers firms with less than ten employees as a small scale enterprise and those with more than ten as a medium scale enterprise (cited by Kayanula and Quartey, 2000). However, the National Board for Small Scale Industries (NBSSI) which is the main governmental institution responsible for the promotion and development of small enterprises uses multiple criteria of fixed assets and employment size to define firms. The NBSSI defines a small enterprise as one employing up to twenty-nine workers with plant value not exceeding 1000 Ghana Cedis (cited in Kayanula and Quartey, 2000).

Since there are many definitions for SME, Storey (1994) urged researchers of small firms not to be restricted by the parameters of the various definitions but should rather employ the one that is suitable for their target groups. Against this background, Steel and Webster (1992) and Osei *et al.* (1993) defined small scale enterprises in Ghana in their studies and used an employment cut off point of 30 employees. They later classified small scale enterprises into three groups as follows:-

1. Micro firms with up to 5 employees
2. Very small with between 6 – 9 employees
3. Small with between 10 – 29 employees

Steel and Webster (1992) in their study on the response to structural adjustment by Small Scale Enterprises (SSE's) in Ghana again defined micro enterprises as those with fewer than four full time employees and small as those with between 4 – 29 full time employees. Rankin, Soderbom and Teal (2002) on the other hand defined firms in their survey of the Ghanaian manufacturing enterprise as follows:-

1. Micro firms with less than 6 employees
2. Small with between 6 – 20 employees
3. Medium with between 20 – 75 employees

It can be observed from the above definitions that the firms are defined differently by the various authors based on the purpose of their studies as stated by Storey (1994) although those applied to micro firms (1 – 5 employees) appears to be similar. According to Kayanula and Quartey (2000), a distinguishing characteristic of SMEs is that they can be categorised into two group's namely urban and rural enterprises and this can be further divided into organised and unorganised enterprises. The organised enterprises have paid employees whereas the unorganised ones tend to rely on labour from family members or apprentices. According to Anon. (2004) the SMEs in the informal sector exhibits certain economic characters such as;

- Family operated and sole proprietorship or with few individuals
- Started and maintained with little capital
- Very labour intensive and mostly ill-equipped with little infrastructure
- Limited from better offering of quality goods

The choice of SMEs for this study was based on the fact that this sector is considered to:-

1. Adapt easily to customer requirements and changes
2. Mainly produce traditional dress in Ghana
3. Promote indigenous technological know-how
4. Cater for local needs of consumers

2.14 Skills Development and the Informal Sector

The development of skills is an important instrument for improved productivity in all manufacturing industries including those found in the informal sector. Literature however revealed that most workers (about 60%) found in the informal sector in West Africa had acquired their skills through informal traditional training or apprenticeship (Fluitman, 1992; Anon. 2004; Liimatainen, 2004) and it appears that this method is the most common form of skills acquisition in this sector (Adu-Amankwah, 2002).

Monk, Sandefur and Teal (2008) are of the view that traditional apprenticeship provides most of the skills in both the private and the public sector and is a system where young men and women undertake training with masters and mistresses of the relevant firms. This method of training is not structured as the name informal implies and it is mostly done through imitation and identification (Liimatainen, 2004). It is suggested that the skills obtained through this method of training are highly sector specific (Monk,

Sandefur and Teal, 2008; Liimatainen, 2004) to the job and lacks any form of standardised curriculum.

The situation is not different in Ghana as 55 percent of workers found in the informal sector acquired skills through informal apprenticeship (World Bank, 1993). The World Bank statistics (1993) on the informal sector in Ghana revealed that about 36 percent of the workers had acquired the tenth grade and 10 percent some tertiary education. According to Monk, Sandefur and Teal (2008), the apprenticeship method of training appears to be common among urban workers in the informal sector in Ghana and is important in providing job opportunities and portrayed primarily as an urban or semi-urban phenomenon (Liimatainen, 2004) which is different from informal agriculture in the rural areas.

From the literature, there seem to be a problem with skills development in most developing countries and Rankin, Soderbom and Teal (2000) concur that the source of the problem for most labour intensive firms in manufacturing sectors in Africa in general could be linked to lack of skills and Ghana's economy could be an example. Sowa *et al.*, (1992) confirmed this view in a survey on small industries in Ghana which revealed that although a large proportion of the entrepreneurs were educated, most of them lack advanced skills in technical and vocational training relevant to most of the enterprises. This meant that most small enterprises lack technically trained labour which prevents them from utilising higher skills that could improve the efficiency of the production operations (Morton, 2004).

Informal traditional training through apprenticeship is considered not be very efficient as it is characterised by lack of defined structure or curriculum with a minimum or lack of theoretical aspects which leads to mainly semi- skilled workers (Liimatainen, 2004; Anon. 2004). Liimatainen (2004) is of the view that skills learnt through traditional apprenticeship have several limitations because 'technologies and ideas are based on previous generations; the quality of the training is just as good as the skills of the master and his or her willingness to; and ability to pass on knowledge and skills to the next generation. Also the theoretical aspect of the learning is weak or absent with only the simplest skills that are learnt and these results in low quality products'. It appears that most employees of SMEs in the manufacturing sector in Ghana acquired their skills through this form of training and it is believed that most dressmakers and tailors in

Ghana have acquired their skills through informal apprenticeships and as a result it appears that this affects the quality of garments produced. Most of the dressmakers trained through apprenticeship lack pattern making skills as the freehand cutting technique is mainly used (Fianu and Zentey, 2000) and also there seem to be a lack of creative abilities and good finishing techniques. This method of garment production does not promote standardisation as paper patterns are not used for cutting out hence; the reproducibility of designs in the same fit may not be achieved.

2.15 The Garment and Textile Industry in Ghana

It is estimated that garment manufacturing constitutes about 60% of the informal sector employment in the urban centres in Ghana (Boateng, 1996). Chimieloweic (1995) in a UNIDO/ILO mission report stated that the total employment generated by garment and textiles firms is around 16.5%. It is evident from the figures quoted above that the garment and textiles manufacturing sector plays an important role in employment generation in the economic development in Ghana as it equips individuals with the ability to cater for themselves as well as their dependants. The garment and textile sector in Ghana is currently considered as the engine of growth for the economy however, this sector has performed poorly over the years. It is for this reason that the government of Ghana in a bid to promote the textile industries launched the Presidents Special Initiative (PSI) in 2001 (Kufour, 2008). In a statement by the Minister for Trade reported in the Statesman 13 July, 2007 explained that the reason for the implementation of the initiative was to 'develop a modern home-grown garments industry, based on mass production technology'. Against this background, the objective for which the PSI was set up is as follows:-

1. To promote the garment sector and to generate employment in Ghana
2. To attract large scale foreign investors into the textile and garment sector
3. To build 100 medium-sized companies by 2004
4. To create a large pool of small-scale local subcontractors and suppliers.

The garment industry is generally considered as highly labour intensive and less capital intensive as most of the processes are still not mechanised and therefore relies on the efficiency of the skills (Rankin, Soderbom and Teal, 2000). These authors suggest that most developing countries such as Mauritius and South East Asia have managed to grow their economies rapidly through labour intensive sectors. They explained that garment manufacturing for example seem to be suitable for those nations seeking

economic development because of the labour intensive nature of its production which can generate a large number of employments even with the least amounts of capital.

The garment and textile industries in Ghana are two different sectors although the two are dependent on one another. The textile industry is mainly concerned with the production of fabrics that are used for the manufacture of garments for the local market as well as for export (Quartey, 2006). Cotton based fabrics are mostly produced although the production of man-made fibres are also undertaken on a small scale. The main cotton-based products are African prints (wax, java, fancy, school uniforms and plain dyed cottons) which are mainly utilised in the domestic market although some of the products are exported to other African countries mainly in the sub-region. Other indigenous fabrics such as *adinkra* (hand-made) batik, tie and dye and kente (hand woven) are also produced. The production of man-made fabrics is predominantly used for school and other uniforms which are normally made in small quantities as compared to the African prints. The textile industry is considered as very capital intensive and relies on mostly on imports of raw materials especially cotton from China and the Far East. There was a steep decline of the textile industries and as at 2002, only four of the firms survived the turbulence and these are the Ghana Textile Manufacturing Company (GTMC), Akosombo Textiles Limited (ATL), Ghana Textiles Product (GTP) and Printex (Quartey, 2006).

The garment sector in Ghana is mainly made up of small- scale and micro enterprises found in the informal sector of the economy. The large scale enterprises are solely into the mass production of textiles and standard garments usually for export into European markets (55%), US (25%), Economic Community of West Africa (15%) and the remaining (5%) into Southern African markets. Some of the garments produced and the majority of the textiles are consumed locally which are turned into traditional and western styled garments. Currently, the garment industry consist mainly of micro and small scale enterprises in the form of sole proprietorships who engage in the production of made-to-measure traditional as well as western garments and mostly utilise fabrics from the textile industries although imported fabrics are also used.

2.16 Garment Production and the SMEs

The use of an efficient manufacturing strategy is vital in coping with the changes in the business environment. Schroeder and Larh (1990) defined manufacturing strategy as an effective plan of manufacturing capability for the achievement of business goals in a

future environment. The most frequently dimensions of a manufacturing strategy include cost, quality, delivery and flexibility and although companies may differ in their application of these four strategies, the apparel producers generally accept these basic definitions (Lin, Moore, Kincade and Avery, 2002). They suggest that production systems need to be in place in order to support the manufacturing strategies as these are dependent on one another. On the other hand, apparel production systems are considered as the integration of materials handling, production processes, personnel and equipment that change raw materials into a finished product (Glock and Kunz, 2005; Lin et al., 2002). Lin et al., 2002 further described the production system as the flow of goods through the system and the relationship of the workers to the equipment to each other. Although various classifications have been developed to meet production needs, the three most common types used for mass produced garments include the progressive bundle, unit production and modular production systems.

The bundle system is the oldest mass apparel production system which is still widely used today and the bundle forms the unit of work (Lin et al., 1994; Glock and Kunz, 2005). As a result, each work station is highly specialised therefore the sewing operators may have to go through an extremely standardise training for increased productivity and large volume. In this system, the bundles consist of garment parts needed to complete a garment component and each size may range from 2-100 components. The bundles flow from workstation to the other within the skills centre.

In the Modular Production System (MPS) a team work is the sewing system and consist a manageable work unit of equipment and work to be executed. In this system, components of one garment are fed into the workflow in single ply so that the bundles of the components are not moved. The number of members in each team may range from 4-15 and varies based on the product components. The success of this system is its flexibility to produce a wide range of products in small quantities.

Finally, in the Unit Production System (UPS) all the components for a single garment are advanced through the production line together by means of a hanging carrier that travels along an overheard conveyor. Most unit production systems are linked to a computer control centre that routes and track the production as they are automated. In this system, automated handling replaces the manual handling in the bundle system and the benefit depends on the effectiveness of its management.

However, Fianu and Zentey (2000) observed that the dressmakers in the SMEs in Ghana do not use any of the production systems discussed above but rather employ the whole garment system of production where an employee finishes an entire garment. Chimieloweic (1995) in a report on the rehabilitation of the textiles and garment industry described this system as 'non-industrial' system of production. This is because according to Quartey (2006) and Chimieloweic (1995), the garment industries in Ghana consists of numerous macro and small scale dressmakers in a form of sole proprietorships and are mainly involved in the production of made-to-measure garments for individuals and employ about 1-30 workers and therefore cannot realize any economies of scale. Fianu and Zentey (2000) concluded in their study that the challenges faced by dressmakers in their study included the following; difficulty in acquiring workshop, lack of marketing outlets, skilled labour, capital and durable and modern equipment. Several researchers have also observed that the SME development is constrained by numerous factors such as finance, equipment and technology and access to international markets (Steel and Webster, 1992; Baah-Nuakoh and Teal, 1993; Aryeetey, 1994).

2.17 Quality and SMEs Development

There are various definitions of quality by researchers, international organisations as well as individual companies. The ISO 9000 (2000) defined quality as 'the degree to which a set of inherent characteristics fulfils requirements'. Quality is also defined as the conformance of product performance to consumer preferences in the decision to adopt the product (Glock and Kunz, 2005; Lin, Moore, Kincade and Avery, 2002). Scheller and Kunz (1998) also defined quality as 'a perceived level of value'. From these definitions, quality may be viewed as a concept geared towards the achievement of consumer satisfaction. Retief and de Klerk (2003) are however of the view that quality may be interpreted differently and from marketer's perspective, quality may refer to performance, workmanship and serviceability standards. Glock and Kunz (2005) concur to this assertion and explained that quality standards tend to be arbitrary especially in relation to consumer specifications as functional needs may at times be considered as high quality and product aesthetics at other times.

Several researchers have established the importance of garment quality to consumers and which is considered as the main reason for the dissatisfaction with garment products

(North, de Vos and Kotze, 2003; De Klerk and Lubbe, 2008) as the preference for a particular garment item is dependent on the price and product attributes. Research has established that in order to satisfy the needs of the consumer, great emphasis should be placed on both the physical as well as the expressive functions of a garment and concluded that garment attributes are importance in relation to consumers in the purchase decision making process (Abraham-Murali and Littrell, 1995; Zhang et al, 2002; Chattaraman and Rudd, 2006; Fiore and Kimle, 1997). Morganosky and Postlewait (1989) found the elements of design such as pleasing lines and designs significantly influence the aesthetic quality of a garment.

Brown and Rice (1998) developed a model for the clothing quality product dimensions which include intrinsic and extrinsic attributes. Intrinsic attributes involves physical features in terms of formal aspects of products such as design, material, construction and finishing. The performance features include the aesthetic aspects such as sensory, emotional and cognitive aspects of products whereas functional aspects involve the utility attributes. These authors described the physical features of a garment as its tangible form and composition whereas the performance features determine the standards and its benefits to the consumers. However, features such as utility which include garment fit, comfort, ease of maintenance and appropriate functioning may be considered as crucial in determining garment quality in terms of consumer expectations. From this model, it can be observed that quality is multi-dimensional which involves several attributes of a given product. Zhang, Li, Gong, and Wu (2002) conducted a study in China on the importance of casual wear attributes product attributes in which they found the five most important garment attributes were fit, comfort, style, colour and workmanship in order of preference in line with the views of Brown and Rice (1998).

In product development, quality standards are important in specification decisions and quality control in order to provide consistency of the product range. Many researchers have established the importance of quality (North, de Vos and Kotze, 2003; De Klerk and Lubbe, 2008) to consumers' which is regarded as one of the main reasons for dissatisfaction with garment products. The process of producing quality garments requires adequate training and adherence to strict standard specifications set by the enterprise in order to meet the needs of the target consumer Glock and Kunz (2005). These authors explained that quality cannot be inspected into a garment but rather built

into it as standards should be maintained throughout the production process from the start to the finished product. This is because, the production of high quality consumer goods requires psychological, emotional and mechanical factors in the quality management process of an enterprise.

Quality management is therefore viewed as "an integrated approach to achieving and sustaining high quality output" (Flynn, Schroeder and Sakakibara, 1994). Similarly, the Department of Trade and Industry (2004) in the UK also defines quality management as the best practice management or modern management as doing things right first time. Quality management is sometimes referred to as strategic quality management or total quality management (TQM) however; they are basically the same no matter how it is described. In order to achieve a high quality in the production of consumer goods such as garments requires the adoption of quality management in all aspects of the enterprise.

In a recent celebration of the 40th Anniversary of the Ghana Standards Board (GSB) based on the theme 'setting the pace for standards and quality' (Ghana Standards Board, 2007) the Deputy Minister for Trade and Industry in a speech commented on the importance of ensuring product and service specifications in the development of trade but said there was more to be done by the GSB in terms of quality enforcement. Although SMEs are seen as the engine of growth for most developing countries, the performance of those operating in Ghana seem to have fallen short due to the lack of effective quality management and coordinated effort to support the SMEs (Fening, Pesakovic and Amaria, 2008). The lack of access to credit has also been attributed to the failure of SMEs in Africa and Ghana. According to these authors, most SMEs in Ghana struggle to operate, manage and improve their businesses efficiently which prevents them from delivering quality products and services on time. This is because it is said that small firms lack the resources to implement quality management and as a result the failure of owner/managers to practice quality management has been identified as one of the major causes of SMEs non-performance. Ampofo (2002) agree that the collapse of most large scale garment industries in Ghana was due to the lack of quality and conformity to standards. Fianu and Zentey (2000) also observed in their study the lack of appropriate modern industrial equipment was likely to affect quality and meeting of delivery time and suggested the automation of the garment industry in Ghana. These authors also observed the use of trainee apprentices for production which was likely to compromise the quality of garments produced. However, according to Glock and Kunz (2005), the development of intrinsic quality such as fit may require a large investment in

materials, equipment and skills. They suggest that the use of advanced technology and automation increases efficiency and accuracy which in turn increases intrinsic quality of products. For example, the adoption of CAD and 3D technologies for garment manufacture may increase the accuracy of pattern development and the gathering of anthropometric data respectively which are needed in the achievement of well fitting garments.

2.18 Chapter Summary

In this chapter the review of literature on the meanings of dress in relation to the Symbolic Interactionist theory and culture was examined as well as the concepts of SMEs and the garment and textiles industries in Ghana.

It is evident from the review of literature that there is no clear definition of dress as other terms such as clothing, fashion, adornment among others have been used interchangeably. However the definition by Eicher and Roach-Higgins (1992) may be considered to be more inclusive as it includes the aspects of the others. The Symbolic Interactionist theory is important in understanding the meaning of dress as a cultural symbol and a social product therefore, the evaluation of dress cannot be separated from the social setting. Whiles culture may be defined differently based on the context, it is clear that it involves material objects such as dress and the non-material which is exhibited through the products of the society. The usage of traditional dress in Ghana involves cultural practices manifested through the symbolic fabrics that are used and also functions as a medium for social differentiation through identity construction.

The importance of the micro and small scale enterprises (SME) is recognised as being significant in the development of the African as well as the Ghanaian economy. As a result, the role of this sector is considered as critical in promoting economic growth and generation of employment towards poverty reduction among the Ghanaian population. It is evident that the importance of the garment and textile industries cannot be overemphasised as its growth has demonstrated the potential to strengthen the manufacturing base of the Ghanaian economy. However, there is the requirement for skills development in the garment and textile industries to improve productivity as these sectors strive to move the economy forward.

It is evident from the review of literature that terms such as tribal, costume, native, traditional, ethnic, indigenous or authentic among others have been used to denote dresses from cultures other than western and there is no clear definition of what constitutes a traditional dress. Similarly, there is the lack of literature on the symbolic meaning and utilisation of the Ghanaian traditional slit and kaba despite its wide usage among the society apart from the works of Matthews (1979) and Salm and Falola (2003). This study is therefore important in providing research based literature on the traditional dress to fill the above mentioned gaps.

CHAPTER 3 Literature Review on Anthropometrics and Mass Customisation

3.1 Introduction

This chapter examines the literature on anthropometrics and mass customisation in relation to the objectives of this study. It defines anthropometrics, explores previous surveys and review sizing systems and critically examines the importance of anthropometrics in clothing manufacture in relation to fit. It also presents the different methods of equipment used for anthropometric surveys. Also included in this chapter is the review of literature on mass customisation in relation to garment manufacture and fit. The concept of mass customisation was also reviewed in terms of anthropometrics, enabling technologies in relation to garment mass customisation and fit.

3.2 Definitions of Anthropometry

Anthropometry is defined as the science of measurement of the human body and is derived from the Greek word "anthropos" which means human and 'metrikos' relating to measuring (Roebuck, 1995, p.1; Konz, 1995 p. 110). According to Roebuck (1995) anthropometry deals with the geometry, mass properties, and strength capabilities of the human body. Tsang, Chang and Tayloy (2000) described anthropometry as the study of human physical dimensions, such as size and the distance between anatomical points which are confined to width, length and girth measurements. Pheasant and Haslegrave (2006) concur to the view that anthropometry is a branch of human science which deals with the measurements of the human body in terms of size, shape, mobility, flexibility and working capacity. Cooklin (1990) suggests that anthropometry is the systematic collection of and correlation of measurements of the human body for the supply of data for various reasons. The Oxford English Dictionary (2007) defines anthropometry as 'the measurement of the human body with a view to determine its average dimensions, and the proportion of its parts, at different ages and in different races or classes' and Kunick (1984) as the science relating to the measurement of man. Pheasant expanded this definition and called it 'applied anthropometrics' which involves 'numerical data in terms of size, shape, and other physical characteristics of the body and its application to the design context' (Pheasant, 1986). Pheasant again explained that anthropometry is the branch of ergonomics and deals with body measurements, particularly those of size,

strength and physical capacity. Jones and Rioux (1997) observed that anthropometry is the study of the human body which involves taking the measurement from body surface landmarks, such as circumferences and breadths. Ujevic et al. (2006) are also of the view that anthropometry as an anthropology method and is concerned with the measurement and testing of the human body and the relationship of dimensions among its individual parts. Anthropometry has also been referred to as human factors engineering. According to Croney (1980), anthropometry is the practice of measuring the human body and it is used by designers and ergonomists for modelling environments, systems or garments for optimum use.

Another term which is used simultaneously in relations to anthropometry is somatometry which is again based on the Greek words "soma", meaning body and "metrikos" pertaining to measurement. The word somatotype is developed from this term and refers to the body shape in terms of physique and its appearance (Tsang et al, 2000). This term was further developed by Sheldon (1940) when he evaluated thousands of photographs in order to describe their physique which he classified into three figure types namely endomorph, mesomorph and ectomorph.

The development of anthropometry added new dimensions to the study of morphology. Tsang et al (2000) explained that anthropometry was first used by Elsholtz, in the seventeenth century in his study in morphology at the University of Padua, where he established a method of taking body measurements. Jones and Rioux (1997) further explained that recorded studies of the human form dates back to ancient times and since the 17^{th} century investigators have made attempts to measure the human body for physical properties such as weight, size and centre of mass.

3.3 Previous Anthropometric Surveys

A considerable amount of anthropometric surveys have been conducted in most countries to generate data for sizing systems. Winks (1997) suggest that a vast amount of data exist on the military of which most have been done in the USA and are published. He further explained that the purpose of these surveys was to develop military equipment and for sizing clothes. According to Winks (1997) the US Army Quartermasters Corps conducted an extensive survey in 1946 and measured over 100,000 men on demobilisation and the US Air Force also conducted a survey on 4000 aircrew in 1950. However, the only nationwide anthropometric survey on the civilian

population on women was conducted in 1939-1940 by the Bureau of Home Economics of the US Department of Agriculture and measured 15,000 subjects using traditional methods (O'Brien and Shelton, 1941). This survey became the basis for modern anthropometric surveys and sizing systems in terms of procedure and equipment.
The most current national anthropometric survey to be conducted in US was the Size USA, which was completed in September, 2003 and used the 3D body scanner as the latest technological development to capture 130 body measurements of 10,800 people (Yu, 2004b; Lee and Istook, 2007). The purpose of the Size USA was to generate a current representative anthropometric data on the US population from a variety of ages, ethnicity, gender and geographic localities.

In United Kingdom, although there have been several surveys conducted on the civilian population, there is limited documentary evidence (Winks, 1997). The first anthropometric survey for women's wear in the UK was conducted in 1957 and the Board of Trade published the results of the survey on 5000 women in 126 sizes and covered 98% of the adult female population between the ages of 18-70 years (Beazley, 1997; Winks, 1997). The most recent anthropometric survey was the Size UK conducted between 1999 and 2002 in which a total of 10,000 men and women were scanned using 3D technology. A total of 140 body measurements were extracted automatically from each subject (Yu, 2004b) for the development of size charts in order to provide consumers with better fitting clothes.

In Germany, (DOB-Verband, 1994) surveys are carried out every ten years in order to update anthropometric data on the population for outer wear. According to Winks (1997) the first survey was conducted in 1957/58 and in 1960/61 in which the results were published by Hohenstein Research Institute in 1963. Further measurements were taken in 1970 then published in 1971 and another survey was conducted in 1981/82 involving 10,000 women and girls with the results released in 1983.

In Japan, a survey of 35,000 subjects was conducted in 1966/67 and ten years later a further survey was conducted in which 50,000 subjects was measured and involved male and female adults, children and infants. However, another survey was conducted to understand the changes that have occurred in body size and shape using 3D scanning technology in 1992-1994. This survey captured 178 body measurements of 19,000 males and 15,000 females between the ages of 7-90 years and revealed that the mean

height of the Japanese has increased by more than 10cm over the last century (Yu, 2004b).

According to Zwane and Magagula (2007) it appears that most developing countries in Africa adapt the British sizing system for their local use as there are differences in the figure types. Winks (1997) suggest that a restricted survey has been conducted on black miners in South Africa around 1980 which involved 669 male subjects and Mluali (2003) also conducted a survey for women's size charts in 2001/2002. A national anthropometric survey was initiated by African Body Dimensions (ADB) in 2004 to develop a comprehensive database required for clothing size and fit to cater for the diverse population of South Africa. This survey was conducted using the 3D body scanner housed in mobile unit for measurements to be taken all over the country (Yu, 2004b). Although Otieno (1999) conducted an anthropometric survey in Kenya, the subjects were children between the ages of 3-6 years old and therefore did not include the adult population.

3.4 Review of Sizing Systems

Several garment sizing systems have been developed in the world today in order to increase consumers' satisfaction with garment fit (Otieno, Harrow and Lea-Greenwood, 2005). Sizing systems are generally designed to fit a target population which is normally defined by classification of body type (Chun-Yoon and Jasper, 1993). In this regard a sizing system can be defined as a set of sizes derived using common assumptions and methods of development (Ashdown, 2003 p.1). LaBat (2007) and Salusso-Deonier et al. (1985-86) asserts that sizing systems are developed by applying a body form classification method to an appropriate data base. According to Schofield and LaBat, sizing systems may be considered as sets of size charts; each created to serve a particular body type category in the population (2005, p. 13).

Most of the sizing systems developed was based on the classification of women's figures types which are determined by body development and body measurements or age (Chun-Yoon and Jasper, 1993). The purpose of developing a sizing system is to find a reasonable number of groups that will accommodate as many shapes and sizes found within a population in order to provide a well-fitted garments for the consumer at the same time allowing the manufacturer to make profit (Winks, 1997; Yu, 2004b). La Bat (2007) suggests that there is a need to base sizing systems on good anthropometric data.

As a result several sizing systems have been developed over the years for specific countries based on anthropometric surveys that have been conducted for those countries. The American survey of 1939-40 conducted by O'Brien and Shelton (1941) was the foundation for the American sizing system. This sizing system has categorised the American female figure types into four main groups namely Women, Misses, Half-sizes and Junior which describes the body characteristics (Bond, Liao and Turner, 2000: Chun-Yoon and Jasper, 1993). Women sizes were made for more matured women, Misses' sizes were made for the youthful figure, Junior's were styled for young girls and Half-sizes were made for the shorter figure.

Chun-Yoon and Jasper, (1993) further explained that, the sizing systems developed in UK (1957), Germany (1983), and Hungary (1986) on the other hand, classified figure types by height and the drop value. According to these authors, a sizing system was developed by the Joint Clothing Council in the UK for ready-to-wear clothes defined by three figure types by height. In this system, a woman's height below 155cm is classified as short height; a range between 155cm and 165cm is classified as average height and above 165cm is classified as tall height.

The German sizing system was developed by DOB-Verband in 1983 in which nine figure types were classified by height and hip types. The height was divided into three main groups' namely normal or average height, short and tall heights respectively which are further divided into three groups based on the hip size (Winks, 1997; Chun-Yoon and Jasper, 1993).

The Hungarian sizing system (MSZ 6100/1-86) classifies women's figures by height and body build. The figure types are classified as normal figure with hip 4 cm larger than the bust measurement, and the full figure which has the hip 8 cm larger than the bust measurement (Winks, 1997).

3.5 Anatomical Points and Measurements

The achievement of good fit is determined by the way in which the body is measured and anthropometrists are continually faced with the task of deciding on parts of the body to be measured (Otieno, 1999). However, the parts of the body to be measured are mostly determined by the aims and objectives of the anthropometric survey. Landmarks placed on the body are important in ensuring accurate measurements (Croney, 1980;

Ujevic 2006; Strydom and de Klerk, 2006; Yu, 2004a), which denote the position, the beginning and the end of a measurement. However, identifying measuring positions, landmarks and dimensions has been an issue in measuring the human body for clothing anthropometric surveys (O'Brien and Shelton, 1941; Kemsley, 1957; Kunick, 1984). Yu (2004a) observed that landmarks are located by anatomical points based on their positions on the body and explained that structured methods of land marking are important for the consistency, reproducibility and the reliability of the anthropometric data and the process more efficient. Land marks may be located by feeling the bones beneath the skin and marked on the body (Roebuck, 1995). Ujevic, et al. (2006) are of the view that in order to locate landmarks accurately, it is vital to study and understand the proportions of the human body and the relationship between the individual body parts. They further divided body points into two categories as fixed and virtual positions. Fixed positions are those points that are clearly visible at the same parts of the body and are easily determined. On the other hand, virtual positions are changeable in relation to the bodily posture which makes their location difficult and therefore depends on the experience of the measurer. In locating positions for landmarking, it is important to bear in mind that there are different variations among individuals with different bone structure which requires expert knowledge if accurate measurements are to be obtained. The BS EN-13402 (2001) however has provided a guide for traditional measurements which suggest that the different body dimensions should be measured in a standard position as explained in Section 5.7. In terms of the body dimensions to be measured, past research (O'Brien and Shelton, 1941; Kemsley, 1957; Kunick, 1984), the BS EN-13402 (2001) and ISO 8559 standards have recommended a series of measurements that are required for specific type of garments which include the control or primary dimensions as well as other secondary dimensions. However, the method of measurement used for any anthropometric survey is entirely left to the researcher based on the equipment, time and finances that are available.

3.6 Body Measurement Techniques

The measurement of the human body is necessary for garment production as fit is determined by the relationship between the body and the garment. Several techniques and equipment have been used in the past which ranged from a simple tape measure to the current advanced techniques of 3D body scanners. Bye et al, (2006) evaluated the various methods of extracting body measurements and concluded that the resulting data

could be described under five categories namely points, lengths, surfaces, shapes or volume. According to these authors, linear methods utilise the distance between two points whiles multiple probe methods adopt tools that describe body contours as well as the relationship between body parts. On the other hand, body form methods provide information about surface, shape and volume of the body. Thus whatever technique is employed to measure the body may fall under one or several categories described above. It is therefore essential to determine the purpose of the resulting data before the selection of the measuring technique.

3.6.1 Traditional Anthropometric Technique

Traditional anthropometry is a method of collecting anthropometric data through the use of manual instruments which has been in use since man expressed his interest to obtain measurements of the average man. This method of measuring the human body extracts linear information from the subject. Traditional anthropometry involves direct contact with the subject and these measurements are taken in standard positions most of which the subject is standing (Croney, 1980). Traditional anthropometry provides different types of measurements of which some are based on feeling the underlying bones (Roebuck, 1995). The first modern study of anthropometric survey utilised the traditional method of body measurement in the O'Brien and Shelton study in 1941 which became the foundation of all surveys. This method of obtaining data relies on landmarking the body prior to taking measurements with devices such as tape measure, calliper, weight scale, sliding compass, head spanner and anthropometre. The first step in traditional landmarking involves marking certain body places, with non-smearing, skin pencil (O'Bien and Sheldon, 1941), skin-safe washable ink (Roebuck, 1995) or coloured adhesive strips (Beazley, 1997). For years, traditional anthropometry has been used to conduct several national sizing surveys such as in USA, Germany, France, United Kingdom and South Africa. The studies which utilised this method of body measurement include (Vronti, 2005; Beazley, 1997; Otieno, 1999; Otieno and Fairhurst, 2000 and Gupta and Gangadhar, 2004). This method of measuring the human body is labour intensive, time consuming and expensive and its accuracy depends on the expertise of the measurer through the touch and eye judgement. Despite the shortfalls of traditional anthropometry, it has continued to be used until the recent development of non-contact 3D technologies.

3.6.2 3D Body Scanning Systems

The development of three-dimensional body scanning technologies is considered as a breakthrough in anthropometric studies (Bougourd, 2007) and may have considerable effect on the apparel industry in terms of collecting anthropometric data and garment fit as it describes all the five categories listed by Bye et al (2006) in Section 3.6. 3D anthropometry is a quantitative study of human body region and organ surface, volume, and shape characteristics using non-invasive methods (Vannier and Robinette, 1995) and provides a detailed description of an individual's body in a very fast and more accurate manner than the traditional method. This method defines population norms and evaluates individual subjects or groups for the design and fabrication of tailored products. According to Yu (2004c) there are four main categories of applying the 3D body scanning may be used which include anthropometric survey, mass customisation pattern generation, tailor-made mannequin and clothing fit evaluation of appearance. The 3D method has an advantage of obtaining unlimited measurements of the human body within seconds for anthropometric purposes, and has a potential of producing more reliable and precise data (Bougourd, 2007; Istook and Hwang, 2001; Yu, 2004c). The above authors are also of the view that, this method of collecting anthropometric data which provides linear and non-linear measurements with the possibility of creating garments that better conform to the three-dimensional shape of the human body and promote the production of mass customised garments. With 3D scanning technologies, body shapes and angles are easily obtained and analysed in addition to linear measurements which are normally obtained in traditional or manual measuring system.

According to Petrova (2007), the development of 3D body scanning technologies will have a great influence on the development of sizing systems by providing more reliable three-dimensional measurements of the human body within seconds. The ability to capture three-dimensional measurements within a short time will facilitate anthropometric surveys (Istook and Hwang, 2001; Yu, 2004c). The main types of body scanning systems are laser and light although there are other forms that are not currently used for scanning the human body. 3D scanning systems capture the outside surface area of the human body by using optical methods with light without physical contact with the body (Istook and Hwang, 2001; Yu, 2004c) and the scanned subject normally wears a fitted garment or under garments. Body scanning systems consist of light sources, vision or capturing devises, software, computer systems and monitor screens in order to visualise the scanned image. Some of the light based systems include the

Hamamatsu body lines scanner, LASS developed by Loughborough University, 2T4 AND 3T6 by TC2, Triform by Wicks and Wilson Limited, SYMCAD 3D Virtual model by Telmat and Turing C3D by Turing. Among laser-based systems are WBX, WB4 by Cyberware, Vitus Pro and Vitus Smart by Tecmath, Viro-3D Vitronic and VOXELAN by Hamano.

According to Yu (2004b) the Japanese size survey (1992-94) was the first national anthropometrical survey to be conducted using 3D body scanning and other surveys such as SizeUK, China, Japan, Netherlands, France and Size USA (Bougourd, 2007) have proved successful due to its ability to extract several body measurements in seconds without any physical contact. The Size UK, a national survey was conducted in 2001 and measured 11,000 subjects with 130 body measurements were extracted from each subject (Bye et al., 2006). Similarly, the Size UK was used as a model for Size USA, a national survey in 2002 which measured 10,000 adults between the ages of (18-80) years from the race diversity of USA.

3.7 Importance of Anthropometrics in Clothing Manufacture

According to Pheasant ergonomics is a science and is defined 'as the application of scientific information concerning human beings to the problems of design' (1986, p2). He further explained that 'if an object, an environment or a system is intended for human use, then the design should take into account the characteristics of its human users'. Anthropometrics which is a branch of ergonomics is concerned with the measurement of human beings in order to "determine its average dimensions, and the proportion of its parts, at different ages and in different races or classes" (Oxford Advanced Learners English dictionary, 2007). The development of the clothing industry is dependent on the sizing of mass produced clothes which is an issue that confronts a manufacturer.

Anthropometric data is used for various purposes of which clothing sizing is one. The clothing industry is concerned with the production of well-fitting mass produced garments for various ages and sizes of a given population and this can only be achieved through the collection of anthropometric data on that population (Cooklin, 1990). According to Kunick (1958) measurement and size are synonymous as there is the need to obtain a reliable data of the population in order to define the range of variation and their frequency distribution for garment production. Ujevic et al (2006) explained that

anthropometric measurements are applied in the production of fashionable clothing and footwear and this data is obtained by measuring a representative sample of the target population. In order to satisfy the clothing needs of consumers within a particular population which varies in terms of age, size and shape, anthropometric measurements are needed for the purpose of developing a more accurate sizing system for the manufacture of mass produced clothes.

3.8 The Role of Sizing Systems in the Fit of Clothes

Several studies have been conducted on the development of sizing systems for different target groups (Vronti, 2005; Gupta and Gangadhar, 2004; Beazley, 1998; Otieno, 1999; Kemsley, 1957). Sizing systems are sets of size charts created to serve a body type category of the population and manufacturers develop these systems with the intention of satisfying consumers' needs for well fitting garments (Schofield and LaBat, 2005). According to Istook and Hwang (2001) manufacturers cannot solve the issues of fit without accurate body measurements and Kemsley (1957) concurs that the usefulness of any anthropometric data is to solve design problems as these data are used to define appropriate fit dimensions. Ujevic et al., (2006) explained that the development of sizing systems are important in the manufacture of fashionable clothing and footwear as this facilitates an efficient choice applicable to the individual and group needs. Ashdown (1998) agree that the purpose of a sizing system is to make clothing available in a range of sizes that fits as many people as possible. Since the introduction of mass production, sizing has been used as a tool to categorise consumers into standardised body and garment dimensions in order to facilitate the production and retailing of clothes (Beazley, 1997).

Generally, fit and sizing are interrelated as the fit of a garment is dependent on a sizing system that allows consumers to select appropriate garments that conform to their body shape. Several researchers have defined fit differently but the underlying factor is the relationship between the garment and the body. Fit may be defined as the way a garment conforms to the body (Workman and Lenz, 2000) or according to Chen (2007) it is the relationship between the size and the contour of the garment as well as those of the human body and suggests that fit is dependent on five factors namely ease, line, grain, balance and set. On the other hand, Ashdown and O'Connell (2006) explained that a garment's fit involves multiple factors such as size, proportions, posture of the wearer,

the dimensions and drape of the garment. Ready-to-wear garments are designed to fit consumers with varied sizes and shapes that are not known to the manufacturers. LaBat and De Long (1990) assert that sizing contributes to garment quality as consumers are interested in garments that enhance the appearance and comfort through good fit.

It has been established that consumers in general have been dissatisfied with the fit of ready-to-wear garments and the most obvious reason for consumer dissatisfaction with fit of garment is that it does not conform to the body dimensions of the individual (LaBat and DeLong, 1990; Otieno, Harrow and Lea-Greenwood, 2005). According to Winks (1997) the effort by the clothing industry to provide well fitting garments is based on their sizing systems and Kunick (1984) further suggests that size charts are generated from sizing systems and provide the measurements needed for garment manufacture. Most fit problems may be as a result of the variations in the human figure in terms of the contours, posture and proportions (Kwong, 2004) which requires specific fit for most consumers as well as the use of outdated sizing systems. Garment fit problems are costly and frustrating not only for consumers but manufacturers and retailers as well which could be in the form of returned merchandise, lost sales, brand dissatisfaction or time wasted in the fitting room (DesMarteau, 2000). Since body measurements are the basis for pattern construction (Workman, 1991), Ashdown and O'Connell (2006) observed that good fit requires a proportional balance between body and garment that can only be achieved through development and implementation of appropriate sizing systems, effective pattern making and quality manufacturing.

However, most individuals have different body proportions that require specific fit requirements and as a result many may have problems with ready-to-wear garments which are made for the average normal figure types using standard body measurements. Chen (2007) evaluated the fit in the made-to measure process by looking at basic garments among Taiwanese students with different figure characteristics. The findings revealed that individuals with multiple figure variations may have difficulty with the fit of ready-to-wear garments that are produced from standard measurements. Miller (1993) found that black women have distinct fit requirements and concluded that body proportions differ according to their racial origin. Similarly, Giddings and Boles (1990) also found in their study that black male subjects had specific fit problems around the thigh area due to differences in body proportions which underpins the development of size charts for specific populations.

In this regard, Vronti (2005) and Otieno (1999) suggest that the development of size charts must be local in order to cater for specific populations with distinct body characteristic as found in different geographical locations. As a result several sizing systems have been developed for different countries and age groups to cater for specific variations in populations in order to increase consumers' satisfaction with garment fit (Yu, 2004a; Chun-Yoon and Jasper, 1993). These authors traced the problems with fit to the use of outdated anthropometric data for the development of the sizing systems and lack of appropriate size range to cover the variations among the population. Well fitting clothing is therefore important for consumers as it enhances appearance and confidence, whilst a well designed sizing system may help to provide clothes that fit.

3.9 Made-to-Measure and Anthropometrics

The made-to-measure (MTM) industry has been in existence for a long time in the field of menswear or traditional tailoring. In this technique of clothing production, the consumer is placed at the beginning of the chain and the design, colour, textiles and the individual's body measurements are utilised to alter existing patterns in order to improve the fit (Daanen and Hong, 2008, Turner and Bond, 1999) of the required garment. MTM is facilitated by 3D body scanners which capture the individual,s body measurements as Computer Aided Design (CAD) is utilised to modify existing patterns for the MTM garment rather than using traditional methods (Apeagyei and Otieno, 2007; Chen, 2007; Istook, 2002). According to Beazley and Bond (2003), new technology has significantly affected the manufacture of garments in the field of MTM and has allowed the manufacturer to quickly respond to consumer demands. They emphasized the use of computerised software in altering standard graded patterns and suggest that MTM strategy requires the following in order to achieve the required results:

1. A measuring technique to capture the individual's body measurements
2. A complete set of standard size chart with the full range for the different figure types and
3. Standard garment patterns for all the different figure types in the corresponding size charts.

On the other hand, in custom made clothing each garment is unique and is made using the individual's preferences with which completely new patterns are generated not by altering existing ones but are made specifically for that individual. Custom made

garments have been produced by tailors, dressmakers and home sewers before industrialisation of garment production. In order to improve the fit of the garments, fitting trials may be made before the garment is completed which directly increases the quality of the garment.

In both MTN and custom made garments, the utilisation of the individual's anthropometric data is critical in determining the fit of the garment

3.10 The Concept of Mass Customisation

Various researches have been conducted on different aspects of mass customisation of garments and other industries (Kinkade, Regan and Gibson, 2007; Bardakci and Whitelock, 2005; Fiore, Lee, Kunz and Campbell, 2001; Anderson- Connell, Ulrich and Brannon, 2002). The oxymoron mass customisation was coined by Davis (1987) from mass production and customisation which Pine (1993) further developed the theory and defined it as "the production of customised goods and services on mass basis" (p. 48). Pine (1993) and Davis (1987) first introduced and defined mass customisation as a business strategy that provides the consumer with exactly what is required and when it is needed. Thus, this strategy in its broadest sense provides consumers with individually tailored goods and services to suit their specific needs and requirements but at the same time maintaining the principles of mass production (Gilmore and Pine 1997) for reduced cost which makes products affordable for consumers. With this approach each consumer is seen as an individual segment by fulfilling their unique needs and desire but at the same time doing so on mass basis. According to Rangarajan (2000) mass production is product centric and focuses on uniform products, whereas mass customisation, on the other hand, is consumer centric and offer individually tailored products on a large scale as it integrates consumers into the product development. Product-centred mass production is about producing more products even though, there is always a difference between a company's offerings and consumer needs (Bardakci and Whitelock, 2005).

Pine (1997) further explained that whereas the market of mass production is large and homogeneous that of mass customisation is fragmented and heterogeneous. As a result mass customisation has identified variations in consumers' needs thus necessitating the adjustment of the products to suit each individual (Gilmore and Pine 1997). Therefore, the aim of mass customisation is to produce exactly according to consumer specification as a product driven market is been replaced by consumer driven system that focuses on

production of wider variety of products (Fiore *et al.*, 2001). Mass customisation as a concept integrates consumers into product development by placing them at the beginning of the value chain as the goal of mass customisation is to satisfy consumers with exactly their needs. With mass customisation, consumers have access to a variety of relatively low cost, high quality customised products while manufacturers can reduce excess inventory and markdowns (Lee and Cheng, 1999) through product differentiation. From a company's view point mass customisation may be defined ' as the ability to provide consumers with what they want, whenever they want it, wherever they want it and however they want it' (Bardakci and Whitelock, 2005). This is because consumers are no longer willing to sacrifice their preferences for standard goods and services that do not meet their specific demands and in that case may be willing to pay extra for their exact needs.

Several approaches to the levels of mass customisation suited for different products have been proposed. Gilmore and Pine (1997) described four approaches to mass customisation as:-

1. Cosmetic customisation which changes the representation of a product but not the nature of the product.
2. Transparent customisation continues the standard representation of the product but changes the nature of the product for individual customers.
3. Adaptive customisation neither changes the product nor the representation of the product for individual customer, but offers products that individual customers can independently manipulate to suit their own needs without any additional interaction with the company.
4. Collaborative customisation involves changes in the design of the product itself as well as the representation of the product.

Duray, Ward, Milligan, and Berry (2000) also suggested four approaches to mass customisation and named them as follows:-

- Assemblers provide a large range of choices without the involvement of customers
- Modularizers use components common in the design and fabrication stages and involves consumer unique specifications for the assembly and user stage
- Involvers allow consumers' unique specifications in design and fabrication stages but use modularity during the assembly and fabrication stages
- Fabricators involve consumers creating individual designs and fabrications through the manipulation of modular components.

Based on the above, apparel mass customisation is approached using collaborative customisation (Gilmore and Pine, 1997) and fabricators customisation (Duray et al., 2000) as consumers are interested in changing the design and fit of garments which is facilitated by the use of enabling technologies. Similarly, Anderson et al. (2002) developed a model from their consumer research through the application of information and new technologies and proposed four options in apparel mass customisation which they named as expanded selection/search, design option, co-design and total customisation. They explained that in the expanded search, information technology will permit the consumer to search for various product lines available. Secondly, the design option will allow the consumer to select the preferred design, fabric, colour, sizing and style details to create the personalised garment through the application of CAD and digital printing. Thirdly, the co-design option will provide additional personal fit through the design options available and finally, the total custom option will communicate the consumers own design to manufacturers through a digital format.

3.11 Mass Customisation and Enabling Technologies

Lee et al., (2002) defined apparel mass customisation as a technology-assisted process that allows consumers to modify a product to suit individual preferences in terms of design and fit. Central to the implementation of mass customisation is the application of advanced enabling technologies such as computer-aided design (CAD), flexible manufacturing systems and advanced computer information technology (Pine, 1993; Loker, 2007; Lee and Chen, 1999). Pine (1993) further explained that the use of these technologies will facilitate the mass production process thereby reducing product life and development cycles which is a vital aspect of mass customisation. The purpose of mass customisation is to provide choice for consumers to personalise their garments at a low cost through the application of advanced technology. As a result, the two most important options available in mass customisation of apparel are body scanning for better fit and co design for a unique design which are specific to the consumer (Fiore, Lee, Kunz and Campbell, 2001).

The use of 3D body scanning technologies allows manufacturers to directly capture individual body measurements of consumers (Bougourd, 2007; Loker, Cowie, Ashdown and Lewis, 2004; Ashdown and Dunne, 2006; Anderson-Connel, Ulrich and Brannon, 2002) which are required for apparel customisation. The availability of several linear

and non-linear measurements from the 3D data make it possible for garments to be made in a way that conforms properly to the three dimensional form of the human body (Hwang and Istook, 2001). The development of 3D scanning technologies have a significant influence on mass customisation in the garment industry as it provides a means of obtaining detailed measurements of consumers in a fast and automatic way. The use of 3D as a method for the collection of anthropometric data, although expensive is efficient, saves time and more accurate as it provides consistency of measurements (Bougourd, 2007) when compared to the traditional manual methods. SizeUK and other anthropometric surveys were conducted using the 3D body scanning technology. According to Hwang and Istook (2001), the use of 3D provides accurate data which redefines sizing systems by closely matching the current shapes of the human figure to the garments produced by companies that are consumer focused and have adopted the mass customisation strategy. They concluded that the 3D body scanning technologies have a potential to facilitate the mass customisation in the garment industry as it promotes anthropometrics required for the production of garments.

The body scan technology offers consumers the opportunity to create custom patterns for product development and in so doing addresses the needs of individuals in terms of fit requirements. Several retailers offering mass customisation have started using this technology to capture the body measurement of their customers such as Brook Brothers who employ this technology for the production of custom made suits for their clients (Loker et al., 2004). Levi Straus also uses 3D technology in its San Francisco store to promote the Original Spin Customised jeans. Similarly, catalogue retailer Land's End also use 3D scanning installed in mobile vans to capture the body measurement of its customers. It was concluded that consumers preference for advanced technology such as the body scanners and digitised images which permit them to see whether the style fits their preferences is important as fit has become a critical issue in mass customisation of apparel (Lee , Kunz, Fiore and Campbell, 2002).

In the same manner, CAD is an enabling technology that is currently used to generate custom patterns with individual body measurements as compared to the use of standard measurements. According to Ashdown and Dunne (2006), advanced CAD systems have been developed to generate automated custom-made patterns based on consumers' body measurements and fit preferences which are important in apparel mass customisation. Glock and Kunz (2005) agree that the use of CAD allows manufacturers to develop and grade patterns for new designs faster and more accurately than with manual methods.

And the developments in the area of information technology has improved the traditional functions of CAD and offered a new way of using these systems for pattern making (Apagyei and Otieno, 2007). In mass customisation of garments, specialised CAD systems can either modify existing patterns to suit individual measurements and fit preferences or completely develop a made-to-measure pattern directly from the consumers' body measurements (Loker, 2007) and can be digitally connected with plotting and cutting technology.

Similarly, mass customisation also allows consumers to be involved in the design process by allowing them to adjust some of the design features in relation to their individual measurements. Anderson et al., (2002) in their research explained that 'co-design' option allows the consumer to select from the manufacturers' designs, style options and details, colour and fabric to personalise their garments through the application of computer aided design (CAD) and digital printing. They concluded that the 'co-design' option offers additional personal fit and design preferences to the consumer which is vital in apparel mass customisation.

The application of flexible manufacturing systems is equally important in mass customisation of garments. The success of the mass customisation of garments largely depends on the utilisation of an efficient production process that involves information as well as production technologies (Loker, 2007) that require the manufacture of single garments in terms of size, fabric, colour and style for individual orders. This author further suggest that flexibility is required throughout the whole production process to facilitate small-lot repeats in single-ply cutting, unit systems and modular manufacturing which is achieved through the application of advanced technologies. Flexibility is also important in the assembly of the variety of styles and sizes at the same time. In this regard, made-to-measure pattern development, single ply cutting and computerised routing are emerging technologies that facilitates the production of mass customised apparel.

3.12 Mass Customisation and Apparel Production

Several studies have been conducted into consumers' willingness to accept the different aspects of customisation of garments (Choy and Loker, 2004; Fiore, et al., 2004; Lee, et al., 2002). According to Lee and Cheng (1999) a growing number of apparel manufacturers have begun to implement mass customisation. Given the change in today's consumer interest and industrial competition, mass production system is unable

to satisfy both the manufacturer and the consumer however mass customisation may achieve both manufacturer and consumer satisfaction by providing a low cost customised product. And since consumers have different lifestyles, cultural orientations, and physical characteristics, mass customisation as a new marketing strategy aims at satisfying these individual needs through product differentiation rather than product standardisation. Mass customisation is considered as both a production concept and a business strategy that is enabled by technology (Anderson, Connell and Ulrich, 2002; Pine, 1993; Loker, 2007) and these technologies allow the manufacturer to directly communicate with the consumer thereby developing customised products within the mass production process. In terms of garment mass customisation, it is believed that by matching the needs of the consumer more closely with the features and attributes of the product, a mass customised garment may decrease fit issues and consumer sacrifices mostly related to mass produced goods. This is because of the diversity of body forms of the individual consumers which requires different body measurements if garments are to fit properly.

Against this background, Fiore et al., (2001) described mass customisation as a process that "allows the customer to engage in direct input to modifications of a company's product to meet his or her individual design taste or fit requirements" (2001, p.101). They concluded that consumers are willing to create unique products as well as an exciting experience from the co-design option available to them. However, the high interest in mass customisation of garments appears to stem from the issues with fit of mass produced garments in which standard set of measurements are used in a product centred market.

3.13 Importance of Anthropometrics in Apparel Mass Customisation

It has been identified from literature (Lee and Chen, 1999; Anderson- Connell, Ulrich and Brannon, 2002; Istook and Hwang, 2001) that the use of adequate body measurements information of the individual is crucial in achieving fit in mass customisation of apparel as fit has become a key issue for most consumers. Fit problems may be the causes of garment returns of ready-to-wear garments (Lee et al., 2002) and women's wear especially has been affected by the issues of fit such that some manufacturers and retailers have adopted the 3D body scanner to capture the measurements of their consumers. Cooklin (1990) explained anthropometry as the

systematic collection of and correlation of measurements of the human body for the supply of data for various reasons of which one of them is the manufacture of ready-to-wear apparel. And these measurements are used in matching the dimensions of a garment to the wearer however research has indicated that consumers are dissatisfied with the fit of apparels that are offered by manufacturers (DesMarteau, 2000; LaBat and De Long, 1990).

One major source of fit problems can be traced to sizing and grading systems that are based on proportionate standard measurements as seen in mass produced garments. According to Pheasant (1987) the characteristics of any given population are dependent on factors such as sex, age, ethnicity among others. However variations in figure types and the use of standard measurements for the production of ready-to-wear garments could be challenging as most individuals do not fall within standard measurements. However in mass customisation of garments, size developments are more personal as the individual customers' measurements are used (Loker, 2007) in order to personalise the fit preferences according to the body dimensions. It has been suggested (Anderson-Connell, Ulrich and Brannon, 2002; Istook and Hwang, 2001) that one potential solution to provide well fitting garments for the population is by providing mass customised apparel through the use of 3D body scanning technology which reduces the errors associated with manual methods of obtaining body measurements. Choy and Loker (2004) conducted a study on mass customisation of wedding gowns on the internet which confirmed a high interest in the willingness to design and purchase the gown as a result of its personalisation for individual's design and fit preferences.

3.14 Chapter Summary

In this chapter, literature related to anthropometrics was critically examined which included the definition, previous surveys and critically examined anthropometrics in relation to the fit of garments. Also reviewed was the literature on mass customisation in relation to the use of enabling technologies, anthropometrics and the importance of garment fit.

It was observed from the literature that there is no clear definition of anthropometrics, however, the term in its simplest form relates to the measurement of the human body. It is however, interesting to note that a considerable amount of anthropometric surveys

have been conducted in the past in several countries which had an impact on the development of sizing systems for clothing manufacture and its utilisation provided baseline information on pattern making and grading of patterns nationally. Most of these initial surveys were used to develop size charts, helped to develop procedures for conducting anthropometric surveys and identified the necessary equipment required and these procedures are still in use today around the clothing industry. Garment styling may be universally desired but sizing requires local adaptation as was seen from the several anthropometric surveys conducted by the different countries used in the development of sizing system. Most of the sizing systems were based on the classification women's figure types in terms of development and some countries adopted the height and drop values as the basis for their sizing systems. The German sizing system on the other hand was developed based on height and hip size classification which made this system different from the others.

It is evident from the literature that there is a gap on anthropometric surveys relating to the African population (except South Africa which has been documented) this subsequently has affected the development of sizing systems for clothing manufacture. The lack of anthropometric surveys implied that there is no clear definition of the body form of the black ethnic group origin which may limit garment manufacture in terms of fit. There was also limited literature outlining the procedure for the development of size charts with the exception of Vronti (2005) and Beazley (1997, 1998 and 1999) as well as Roebuck (1995).

It was also observed that several techniques and equipment have been developed for the measurement of the human body which include the traditional and the advanced 3D body scanning method which is considered to be more reliable, accurate and faster although very expensive. Despite the shortfalls of the traditional method of anthropometric data collection which is considered as time consuming, labour intensive and subject to inter-measurer variation, it is still being used around the world today where the 3D scanner is not available.

The basis for mass customisation is to satisfy individual consumer needs by providing custom goods and services at mass produced prices. Although several approaches have been developed for the adoption of mass customisation, garment mass customisation involves collaborative and fabricators as consumers are interested in personalising

designs and the fit of garments to suit individual body types. In order to achieve garment mass customisation, there is a requirement for enabling technologies such as 3D scanners to capture body measurements, CAD and flexible production systems to facilitate the manufacturing process. Several studies have been conducted in the past into consumers' willingness to adopt mass customisation however, the studies by Choy and Loker (2004) and Anderson et al. (2002) are very important in understanding the current study which is focused on the mass customisation of the Ghanaian traditional dress. In conclusion, the importance of accurate anthropometric data in clothing manufacture for mass customisation or mass production cannot be overemphasised as it forms the basis of well fitted garments required for consumer satisfaction.

CHAPTER 4 Methodology for Participant Observation, Interview and Questionnaire

4.1 Introduction

The methodologies for the conduct of the research are divided into two separate Chapters (4 and 5) with the first part focussing on the methodology for the participant observation, interviews and questionnaire. The second part focused on the anthropometric survey in order to address key issues relating to each strategy. This chapter is however focused on the data collection strategies in relation to the production and utilisation of the Ghanaian traditional dress in Ghana. The presentations are divided into two sections according to the order of the field work with the first part focussing on the data collection strategies for manufacturers and the stakeholders and the second part on the consumers of the traditional dress.

For the purpose of this study both quantitative and qualitative approaches were employed to corroborate each other (Malcom, 2003) in order to achieve the objectives of the study which included four data collection strategies: participant observation, interview, questionnaire, and body measurement. Both secondary and primary data strategies were adopted. The conduct of the field work followed the guidelines of the grounded theory (Strauss and Corbin, 1990), which required the researcher to enter the field with no preconceived ideas which may cloud the data collection process. As a result the qualitative data in terms of the participant observation was conducted first. Prior to commencing the fieldwork, a critical analysis of secondary data and archives as appropriate to understand the meaning, evolution, utilisation and production of the traditional dress was conducted (Taylor, 2002; Denzin and Lincoln, 1998). In the first phase, the manufacturers of the traditional dress were observed in their workshops in order to assess how body measurements were taken and utilised in terms of quality and fit. The second phase involved an anthropometric survey to measure the body dimensions of 600 women using methods suggested by Beazley (1997) and BS EN 13402-1 (2001) was conducted for the development of a sizing system for the mass customisation of the traditional dress. This was necessary to determine the proportions of the women's body dimensions and to compare them to existing size charts. The third phase of the study involved the conduct of interviews with garment manufacturers and stake holders to triangulate key issues observed from the participant observation in

relation to the management of anthropometric data in terms of fit, quality and mass customisation which also deals with the first and third objectives. The fourth and final phase included a survey in which consumers of the traditional dress responded to a questionnaire on the meaning, form, evolution and utilisation of traditional dress and focus group interviews were conducted which addressed the first objective of the study.

The quantitative and qualitative data obtained were analysed using descriptive statistics and the analytic inductive logic of concept construction (Strauss and Corbin, 1998; Malcom, 2003) to develop a conceptual framework for a sizing system and a production model for the mass customisation of the traditional dress which addresses the fourth and the fifth objectives. The analyses of the results are presented in Chapters 6 and 7 respectively.

4.2 Data Collection Strategies for Manufacturers and Stakeholders

The data collection strategies utilised to research the manufacturers in the SMEs was observation and interviews which was necessary to understand the meaning, evolution and the utilisation of traditional dress. The current production methods in relation to mass customisation and the management of anthropometric data were also explored to gain an insight into the manufacture of the traditional dress. In terms of the stake holders in the textiles and garment industry, only interviews were utilised.

As this study is viewed from the Symbolic Interactionists perspective in terms of dress communication and utilisation, it is appropriate that the methods of this approach be considered. This employs a qualitative methodology based on observation, interviewing and document analysis with its main aim as exploratory and descriptive (Sarantakos, 1998).

For the purpose of this study which researches the SMEs in the garment manufacturing sector, the definition by the GSS which uses the number of employees will be adopted with a modification to include micro firms as follows:-

1. Micro firms with up to 5 employees
2. Small with between 6 – 9 employees
3. Medium with more than 10 employees

The definition in terms of number of employees was selected based on the fact that the garment manufacturing industry is considered as labour intensive and therefore relies on the number of employees. This definition is adopted for this study as garment manufacturing in Ghana is mainly done in the informal sector by the SMEs which take the form of sole proprietorship (Quartey, 2006) and are engaged in making garments for individuals. More so, the production of the traditional dress which is the focus of this study is predominantly produced by the SMEs through the made-to measure method therefore this definition is deemed appropriate for this research as Storey (1994) suggests.

4.2.1 Grounded Theory

The data collection strategies utilised to research the manufacturers of the traditional dress in the SMEs was observation and interviews which was necessary to understand the current production methods of the second objective. In terms of the stake holders in the textiles and garment industry, only interviews were utilised.

Qualitative research stresses 'understanding' and is commonly utilised in social sciences which "puts the emphasis" on seeing the world from the participant's viewpoint. The methodology considered as appropriate in researching the manufacturers in the SME is a qualitative one and this dictates the type of data collection approaches. The proposed research methodology is characterised by the use of multiple methods from grounded theory (Glaser and Strauss, 1967; Strauss and Corbin, 1990).

4.3 Participant Observation for Manufacturers

The second objective focused on the evaluation of the current information flow in regards to the management and utilisation of anthropometric data for the manufacture of slit and kaba. As the phenomenon under investigation was easily observable, participant observation was selected as the most appropriate data collection strategy (Sarantakos, 1998). This approach allowed the researcher to understand the processes involved in the production of the slit and kaba by means of getting closer to the manufacturers setting in this case, the workshop. According to Schwandt it is 'the theory and approach for the study of individuals' in social and psychological action/interaction in search of

portraying and understanding the process of meaning making' (1994, p.123) which is linked to the Symbolic Interactionists perspectives in research.

Nagasawa, Hutton and Kaiser (1991) are of the view that Symbolic Interactionists evaluates social actions and objects and through these the meanings of clothing are defined. These authors further explained that symbolic interaction employs ethnographic methods in the studies of social meanings of clothes and among these are participant observations and field interviews. This approach follows the proposed premises of Blumer's (1969) methodological position which suggests that in order to understand the world one must analyse it in terms of the way the participants experience it and in the natural context. Another significant point to be made is that the Symbolic Interactionists perspective provided the researcher with a guiding framework to explore how manufacturers of the traditional slit and kaba define the production process.
The basic research assumption for the second objective was that if one wants to understand the production process of the slit and kaba, one need to see the manufacturers experience from their perspective. The inquirer therefore needs to observe what the manufacturers take into account, their individual experiences, what alternatives they have and under what conditions alternative processes are chosen

In a study conducted by Hamilton and Hamilton (1989) on the analysis of dress as a cultural symbol and material object, participant observation was employed to understand the meaning of the Karen dress in Thailand. This approached allowed these authors to critically analyse the Karen dress in relation to the body as a social entity with cultural meaning. For the purpose of this study which is focused on 'slit and kaba' a traditional dress with cultural significance in Ghana (Dogbe, 2003; Salm and Falola, 2002) it is important to critically analyse this dress in terms of its production. Based on this one can compare the current study to that of the Karen dress in terms of the data collection instrument that was used and its objective.

4.3.1 The Development of the Checklist for Participant Observation

In order to observe the current production process of the slit and kaba in relation to the management of anthropometric data and standardisation, a semi-structured checklist was developed. Although the objective under study was qualitative in nature, it was important to structure the observation process in order to categorise the themes that

emerged and as a result a semi-structured checklist was developed to direct the observation procedure (Appendix 3). The themes for the observation were developed based on existing literature as identified under Sections 2.17 in terms of quality standards in relation to garment manufacture as in the observation guide (See section C and E of Appendix 3). Similarly, the profiles of the manufacturers and their employees' were also observed (Section A) to ascertain its implication on the utilisation of the anthropometric data in relation to the fit and quality of the garments produced as observed in Section 2.14 of the literature review in terms of skills development of SMEs.

4.3.2 Target Group for Participant Observation

Patton observed that the key factor in selecting suitable unit of analysis is 'to what unit it is that you want to say something about', (1987: p51). As this research was interested in studying how anthropometric measurements are taken and utilised, manufacturers were selected as the unit of analysis. With the above in mind manufacturers were selected from three regional capitals, which were also metropolitan centres in Ghana using the following criteria:-

- The manufacturers satisfied the definition of small and medium scale enterprises of the Ghana statistical service;
- The manufacturers have been established for not less than three years and produce traditional and/or western style garments.
- The manufacturers belong to either the Ghana National Dressmakers' and Tailors Association (GNDTA) or the Association of Ghana Fashion Designers;
- The manufacturers can communicate effectively in English.

It was necessary to use these criteria to select these manufacturers in order to set parameters for the study since it was impossible to study all manufacturers in Ghana. These manufacturers were contacted through the chairman of each association in all the three research centres.

4.3.3 Sampling Technique for Participant Observation

One of the basic requirements for any research design is the type and number of the respondents to be involved in the study. According to Miles and Huberman (1994, p. 27) 'sampling is crucial for later analysis' as the sampling technique and its suitability have an effect on the scientific austerity in terms of validity and reliability.

In considering the selection of manufacturers to be involved in this study, purposive sampling rather than random sampling technique was considered. The aim of selecting this approach was to sample those who have knowledge and experience related to the topic of the study. Participant observation as a qualitative data collection strategy necessitates purposive or theoretical sampling (Sarantakos, 1998). This is against the background that, purposive sampling encourages the collection of rich data important to the understanding of the research problem. According to (Easterby and Smith, 1991) purposive sampling requires the researcher to develop a comprehensive understanding of the research problem as such the number of cases involved must be less than probabilistic sampling.

4.3.4 Sample Size for Participant Observation

In selecting the sample size for the participant observation, the production process for the traditional slit and kaba was the key determinant. Purposive sampling technique was used to select the sample size after an initial survey in five metropolitan centres namely Accra/Tema, Kumasi, Takoradi, Ho and Koforidua metropolitan centres. The three regional capitals selected were Accra/Tema and Takoradi in the southern sector and Kumasi representing the northern sector. This was necessary as the manufacturers in the other two regional capitals did not meet the criteria set out for this study in terms of size and organisation.

With this in mind, 25 manufacturers were purposively selected from the members of the Ghana Manufacturers and tailors Association in the three metropolitan centres as respondents for the participant observation. This sample size consisted of 2 females and 2 males as the production of the traditional slit and kaba is a female dominated enterprise in Ghana. The ages of the sample size ranged between 24 to 50 years and were divided among the three research centres based on the total number of manufacturers in each centre. In all twelve manufacturers were observed in the Accra/Tema metropolitan area, eight in Kumasi and five in Takoradi metropolitan areas. After the initial survey, the researcher observed that most of the members of the Ghana Fashion Designers Association do not manufacture slit and kaba therefore the researcher concentrated on the members of the Ghana National Dressmakers' and Tailors Association (GNDTA).

4.3.5 Main Participant Observation

Piloting preceded the actual participant observation. This was done in order to determine the suitability of the semi-structured checklist that was developed and also to determine the duration for each observation. The checklist was therefore piloted with two separate manufacturers in Accra to assess its suitability. It was observed during the piloting that the themes were well represented in the guide.

The main observation was carried out in the three selected metropolitan centres in Ghana. In order to gain entry into the field, the researcher contacted the national executives of the Ghana National Manufacturers and Tailors Association (GNDTA) to inform them of the researcher's intention to select some of their members as the target group for the study. An introductory letter was obtained from the Principal of her institution which explained the purpose of the study, and stating the benefits of the study to the garment industry in Ghana.

The researcher was permitted to contact the regional executives of the above associations in the three centres namely Accra/Tema, Takoradi and Kumasi metropolitan centres to obtain permission to involve their members in the research. A list of all registered manufacturers was obtained from the regional executives and this included the profile of each registered member in the selected centres. The manufacturers for the study were selected based on the criteria in Section 4.3.2 and a meeting date was set to explain the purpose of the observation which included a possible date and the duration.

During the main survey, the participants under observation were initially uncomfortable about being studied but within a short time a rapport was developed with the manufacturers. Non-participant as well as participant observations were employed at various stages of the observation process. Each manufacturer was observed on two separate days at their work shops during normal working hours. As the researcher is familiar with the production of garments, the observation process was easy to understand. The duration for each observation lasted between six to eight hours and took place in the month of October to December, 2005. This facilitated the observation process as Ghanaian manufacturers are mostly busy between the months of September and January due the Christmas and New Year festivities. The researcher had the opportunity to observe the utilisation of anthropometric data for the production of various styles, both traditional and western.

4.3.6 Recording of Participant Observations

The observation was recorded in the checklist that was developed for the participant observation and used as a guideline and a diary of other activities was also kept. All aspects of the production process of the slit and kaba was in the checklist. These included the selection of styles, measurement procedures for customers, the utilisation of anthropometric data, method of obtaining patterns and joining and finishing methods that were used among others. The participant observations were coded with odd numbers as a form of identification with Accra denoted as AC therefore (AC01 to AC23), Kumasi (K025 to K039) and Takoradi (T041 to T049).

4.4 Interviews

To ascertain key issues related to customisation and utilisation of traditional dress, ethnographical methods specifically interviews were employed. Kaiser (2002) asserts that qualitative methods are suitable for the understanding of meanings that individuals assign to a phenomenon. This is in line with the qualitative nature of the second objective. Babbie (1998) suggest that a qualitative interview is an interaction between the respondent and the researcher in which the respondent does most of the talking. For the purpose of this study the interview approach used is that of semi-structured interview. Semi-structured interviews lie between structured and unstructured interviews and contain the elements of both. The degree to which it is structured depends on the purpose of the study which was to collect data from manufacturers and stake holders involved with the production of the traditional dress, slit and kaba as well as to collect data from consumers of the traditional dress.

4.4.1 The Development of the Interview Guide

In order to further examine the utilisation, manufacture and mass customisation of the traditional dress, a semi-structured interview guide was developed based on existing literature and the participant observation that was conducted in the study. The semi-structured interview guide was necessary to ensure that important information was not left out and only questions relevant to the objectives were asked. Sections of the interview guide included the meaning, utilisation and evolution of slit and kaba, manufacture and mass customisation of slit and kaba and the development of a sizing

system. The semi-structured interview guide was developed under the general/main themes of the study. These include:-

- Meaning and utilisation of traditional dress
- Evolution of traditional dress
- Manufacture of traditional dress
- Development of a sizing system
- Mass customisation of traditional dress

4.4.2 Sample Size, Selection and Sampling Procedures for Interviews

According to Miles and Huberman (1994) the samples for qualitative research are normally small and tend to be purposive rather than random and the number cannot be pre-specified, but can evolve once the field work begins. As a result the sample size for the respondents was initially not determined however as the fieldwork progressed the number kept on increasing until saturation point was reached when there was no new information. Purposive sampling technique as discussed under participant observation was employed to select the sample size from the three research centres in Accra/Tema, Kumasi and Takoradi metropolitan centres. The sample finally consisted of twelve manufactures of slit and kaba and three stakeholders in the garment industry based on their knowledge of the topic for discussion.

The interviews were conducted in the later part of March and April 2006 over a period of six weeks. Each session lasted for about 60 minutes and was conducted at the offices of the respondents. The interviews were coded with even numbers from (MANU 02) representing the first manufacturer.

4.4.3 Interview with Manufacturers

For the purpose of this study, 12 interviews were held with manufacturers of the slit and kaba. The participants for the interviews were the same manufacturers observed in the participant observation. The researcher contacted these manufacturers during the observation process to enquire about their willingness to participate in the interviews on a later date. In this study semi-structured interview was adopted as the most suitable data collection strategy. The interviews were necessary to clarify certain important issues that were observed during the participant observation. These include method of obtaining patterns, finishing and selection of styles among others.

The researcher contacted the manufacturers for an appointment for the interviews through the telephone or visiting them personally and explained the need for further interviews. The purpose of the interviews was to clarify certain issues that were observed during the participant observations and also to discuss the development of a sizing system for Ghanaian women as well as the mass customisation of the traditional dress. Dates for the interviews were agreed on and these manufacturers were interviewed in their offices attached to their workshops during a time that was convenient to them. Because the researcher was already known to the manufacturers, they were very relaxed and the interviews were held in a friendly environment. The data collection was commenced by greeting each respondent and thanking them for their willingness to participate in the study. The researcher also assured the respondents for confidentiality (through coding) for all the data collection. As a result, the respondents became more confident and provided information on all the topics discussed which included the meaning, utilisation, evolution, manufacture and the development of a sizing system for the slit and kaba. Each interview lasted approximately 30 minutes to 1 hour. A copy of the interview guide can be seen in Appendix 4a.

4.4.4 Interviews with Stake Holders

For the purpose of this study interviews were also conducted with stakeholders in the garment and textiles industry. This was deemed necessary to discuss their views on the mass customisation of the slit and kaba. With this in mind, three stake holders were purposively selected and interviewed. These included the Marketing Manager of Ghana Textiles Production Company (STH 01), the President of the Association of Ghana Industries (garment section) coded as (STH 03), and the Heads of the Dressmaking section of the National Vocational Training Institute (STH 05).

The researcher contacted the stake holders for an appointment for the interviews after explaining the purpose of the study and its benefits to the garment industry as a whole. Different interview guides were developed for the stake holders based on their background and type of data that was needed from them. A semi-structured interview was conducted between the researcher and the stake holders to address the issues in the first and second objectives of the study. Topics discussed included the mass customisation of the traditional dress, the manufacture of local fabrics, the performance

of the garment industries in Ghana and the training of manpower for the garment industry among others. A copy of the interview guide can be seen in Appendix 4b.

4.5 Questionnaire for Consumers

The data collection strategy adopted to evaluate women's attitudes toward the traditional dress was questionnaire and focus group interviews. Babbie (1998) explains that surveys are excellent vehicles for measuring attitudes and orientations in a large population. In surveys information is gathered through oral or written questioning. For the purpose of this study, data was collected through written questioning in the form of questionnaire which was considered as the appropriate method of data collection in order to cover a large number of the target population. Although there are weaknesses of the use of a questionnaire, the advantages out weight its weaknesses. Sarantakos (1998) explains that some of the advantages of questionnaires are that, they are less expensive, produce quick results, offer greater anonymity, reduce bias or errors caused by the presence of the interviewer and are consistent and uniform measure without variation among others. Since mass customisation is a new concept within the apparel industry in Ghana, it was necessary to conduct a survey into consumer preferences and acceptance of mass customisation and utilisation of the Ghanaian traditional dress.

4.6 Justification for the Questionnaire

To explore acceptance of mass customisation and utilisation of the traditional dress, a content validated questionnaire was developed based on the participant observation and existing literature. This questionnaire which was to measure attitudes and opinion had a five-answer response category Likert scale such as 1 (strongly disagree to 5 (strongly agree) with statements or items covering sections on meaning, utilisation, evolution, manufacturing and mass customisation of the slit and kaba. Sarantakos (1998) noted that a Likert scale consists of a set of items of equal value and a set of response categories constructed around a continuum. There were close-ended as well as open-ended questions.

Agbadudu and Ogunrin (2006) conducted a survey in Nigeria to uncover factors that sustain *Aso-oke,* a hand woven ethnic fabric from consumers' perspective. In this study a content validated questionnaires were administered to 140 female workers, 18 years and above in four divisions of a federal tertiary educational institution in Benin City. The sampling technique used in this survey was non-probability purposive sampling

based on the assumptions that typical elements which were likely to provide the researcher with the necessary information were only required. Rajagopalan and Heitmeyer (2005) also conducted a study on ethnicity and consumer choice on Asian-Indians in America. Data were gathered by a questionnaire administered to a non-biased purposive sample of 254 Asian-Indian consumers above 18 years of age. The semantic differential scaling was selected as the instrument to measure involvement in this study. Although the sample sizes for the above surveys were smaller than that of the current study, they could be compared in terms of the data collection method that was used.

To explore acceptance of mass customisation, Fiore, Lee and Kunz (2004) studied individual differences, motivations and willingness to use mass customisation of fashion productions in five different regions in America. A nine-point scale questionnaire from -4 (strongly disagree) to 4 (strongly agree) was administered to a convenience sample of 521 university students. In another study, Lee et al, (2002) explore preferences for mass customisation of product, place, and place in relation to apparel. To measure preferences for mass customisation, a nine-point Likert scale questionnaire from -4 to 4 was administered to a convenience sample of 131 college students in America. Choy and Loker, (2004) also explored the acceptance of mass customisation of wedding gowns by administering questionnaire to a convenience sample of 100 young women in America between the ages of 18 to 32. Although the above studies used questionnaire to explore the acceptance of mass customisation of apparel in general, it was only the Choy and Loker's, (2004) study that focused on a specific type of apparel. This study can therefore be favourably compared to the current study which is also evaluating the acceptance of mass customisation of a Ghanaian traditional dress (slit and kaba). It can be observed from literature that, in order to measure attitudes and orientations, there is the need to adopt a data collection strategy that allows for quantitative descriptive analysis.

4.6.1 Development of the Questionnaire for Consumers

For the purpose of this study a questionnaire was developed based on the first objective of the study, existing literature, participant observation as well as the interviews with manufacturers and stake holders. The questionnaire was developed to evaluate Ghanaian women's attitude towards utilisation and mass customisation of the traditional slit and kaba (Refer to Appendix 5 for Questionnaire)

4.6.2 Selection of Sample Size and Sampling Procedures of Consumers

The researcher visited the government ministries in the three metropolitan centres to assess the population of women employees. From the initial survey three government ministries were selected as these had more female employees. This sampling procedure has been described as non-probability purposive sampling technique in which the elements of the population are not deliberately given equal opportunity to be included in the sample. These ministry sections were the Education, Health and the Internal Revenue Service under the Finance ministry. Three Polytechnics from the metropolitan centres were also selected. Through the use of purposive sampling technique, the sample could be said to be representative of the educational and working population in and therefore can not be generalise to represent the total female population in Ghana. Although the purpose of the current study was not to compare the utilisation of the traditional dress amongst the various ethnic groups, it was assumed that the workers in the three Government ministries and the students and staff of the Polytechnics come from different ethnic backgrounds and also consist of different age groups as a result of the selection of the metropolitan as the research centres. It was identified from the national policy on employment that ethnic background is not a criteria used for the employment of workers in Ghana (The Ministry of Manpower, Youth and employment, 2009). By selecting the ministries and the Polytechnics as the sampling frames, it was also assumed that these women would earn income large enough to afford slit and kaba, would have developed a sense in fashion and interest in dress. Even though the students were still in education at the various polytechnics, they had allowance from their parents and guardians and also received tertiary education loans.

Stratified sampling technique which first divides the population into strata (or sub-group) was used to select the various age groups for the study as the 2000 population census of Ghana (Ghana Statistical Service, 2002) already divides the age groups into four years interval as presented in Table 4.1. This sample consisted of 7 strata of women between the ages of 20-54 who are considered as consumers of the traditional dress slit and kaba. It was assumed by the selection of this age group that, these women would have income enough to afford the traditional dress and be interested in appearance management. It was also observed from the literature that the retirement age for women in Ghana and persons engaged in hazardous jobs is 55 years (Tibuahson, 2003) and as a result6 the selection of this age group is representative of the national working age of women in Ghana. The Stratified sampling technique was therefore used to select the

sample size of 500 women between the ages of 20 to 54 years based on the age group distribution of the 2002 Ghanaian population survey (Ghana Statistical Service, 2002). The sample size was disproportionate to the units of the target population as the various age groups vary in size as presented in Table 4.1.

Table 4.1:Sample Size

	Actual Regional Population				Sampled Regional Population			
Age Group	Western	Gt. Accra	Ashanti	Total	Western	Gt. Accra	Ashanti	Total
20-24	83,493	164,690	162,094	410,277	23	46	45	115
25-29	81,578	151,801	146,144	379,523	23	42	41	106
30-34	64,918	115,736	117,282	297,936	18	32	33	83
35-39	53,486	94,171	98,945	246,602	15	26	28	69
40-44	41,957	73,227	78,992	194,176	12	20	22	54
45-49	31,889	55,174	58,361	145,424	9	15	16	41
50-54	25,815	41,873	48,390	116,078	7	12	14	32
Total	383,136	696,672	710,208	1,790,016	107	195	198	500

(Ghana Statistical Service, 2002)

4.6.3 Piloting and Administering of Questionnaire

Pre-testing and piloting of the questionnaire was done with 50 respondents in order to make corrections where necessary. It was observed that the term mass customisation needed more clarification; the amended schedule is shown in appendix 5.

The public relation officers in the selected ministries were contacted to obtain permission in to the field after the purpose of the research was explained to them. The executives of the Ladies Associations in the selected ministries were then contacted and served as focal persons for easy distribution and collection of the questionnaires.

The Polytechnics in the three research centres were also used as respondents to the questionnaire as it was observed there were not enough women between the ages of 20-24 at the selected ministries. The Polytechnic Secretaries at the various polytechnics were contacted and the purpose of the research explained to them. The researcher was then allowed to contact the heads of the various departments to obtain the list of all female staffs and registered female students in their departments. A representative sample was then drawn based on the age group distribution.

In regards to the ministries, a list of all members of the Ladies Associations at selected ministries in the three metropolitan centres was obtained. The list included the ages of

all the members as this was important to select a representative sample of the various age groups for the study.

In April 2006, 500 copies of questionnaire, specifically designed for the study were distributed through the focal persons to female workers of the three selected ministries and staff and students of the three Polytechnics in Accra, Kumasi and Takoradi. The questionnaires were given to the executives of the ladies associations and heads of departments for administration and collection and this had a positive effect on the return rate. The questionnaires were collected from the focal persons after a two-week period. The use of the focal persons for the distribution and collection contributed to the high return rate of 478 questionnaires (95.6%).

4.7 Focus Group Interviews

In order to have a deeper understanding of the phenomena under investigation, it was necessary to conduct focus group interviews with the consumers of the traditional dress. The focus group interviews were used to strengthen data from the questionnaire especially on mass customisation and utilisation and of the traditional dress. This is because focus group as a qualitative method allows "the explicit use of group interaction to produce data and insights that would be less accessible without the interaction found in a group" (Morgan, 1990). Krueger asserts that a focus group is a carefully planned discussion designed to obtain perceptions on a defined area of interest in a non-threatening environment (1994, p. 6). He further explained that a focus group is typically composed of seven to twelve participants who are selected based on their knowledge and interest in the topic to be discussed. The guide for the focus group interviews was developed based on the first objective of the study, existing literature, participant observation as well as the interviews with manufacturers and stake holders.

New product research often emphasises the use of focus groups and or sample surveys. Although there are many other methodologies for new product research, these two have received considerable attention (Kahle, Hall and Kosinski, 1997). Janesick defined focus group as a group interview with a disciplined approach to studying ideas in a group context (1998, p. 38). This approach could be used as self-contained research techniques (Janesick, ibid) or supplemental technique for qualitative and quantitative studies (Morgan, 1988). According to Threfall (1999) consumer focus group is best

suited for the assessment of attitudes and cognitive topics and is most successful when used in a triangulation of data collection methods. Focus group has therefore become very popular in market research as an alternative or used alongside other quantitative methods.

Goldsmith and Freiden (2004) conducted a study to explore attitudes toward mass customisation. In this study, 608 adult American consumers were selected through quota sampling technique and interviewed using a five-point response format. Similarly, Anderson-Connell, Ulrich and Brannon (2002) also conducted focus group interviews in America to explore consumer preferences in relation to mass customisation. According to these authors focus group research provides a window to the deeper understanding of participants view point.

For the purpose of the first objective which is centred on the utilisation and mass customisation of slit and kaba, three focus group interviews were conducted for consumers between the ages of 20-54 in May 2006. Each focus group consisted of fourteen members, two from each age group classification and the members were selected through purposive sampling technique as discussed in Section 4.3.3 based on the interest in the subject matter and willingness to participate. The representation of all the age groups was necessary to capture the different views of the members in order to avoid bias in the data. One focus group interview was conducted in each of the metropolitan centres and lasted for about 90 minutes and the groups were coded as (FG) denoting focus group thus (FG01) Accra/Tema, (FG03) Kumasi and (FG05) representing Takoradi. A copy of the interview guide can be seen in Appendix 4c. With the permission of the respondents the interviews were recorded on voice recording machines. Hand written notes were also taken alongside by a secretary appointed by the researcher to allow for comprehensive analysis.

4.8 Data Analysis

The qualitative data obtained from the participant observation from manufacturers of the traditional dress; interviews from manufacturers and stakeholders in the garment industry as well as the focus group interviews with the consumers of the traditional dress were transcribed and analysed using the grounded theory approach through microanalysis which required the careful examination and interpretation (Straus and Corbin, 1998). Underlying meanings of the information were noted and categorised according to all the sections of the participation observation and interview guides in

order to critically examine all the emerging concepts. Similarly, the SPSS (12) was used to analyse the quantitative data from the questionnaire in the form of descriptive statistics such as one-way ANOVA, t-test and correlation to determine the relationship among the variables.

4.9 Chapter Summary

This chapter provided details of the data collection strategies in relation to the first and second objectives of the study (p. 11). The process of triangulation was used to evaluate the manufacturing techniques of the traditional dress in relation to the management of anthropometric data and consumers' attitudes toward the utilisation of the traditional dress and through the use of participant observation, interviews and questionnaire. The grounded theory approach was used to collect the qualitative data in line with the data collection strategies of the Symbolic Interactionists perspective in order to ascertain the key issues of the objectives.

Firstly, participant observation was conducted with 25 manufacturers of the traditional dress selected through the non-probability purposive sampling technique. The observations were conducted in the workshops of the manufacturers to understand the processes involved as well as to see and experience the participants' perspective. The participants were each observed twice during normal working hours and the data was recorded on the checklist developed for the study.

Secondly, interviews were conducted with twelve garment manufacturers selected from the same sample as the participant observations. A semi-structured interview guide was developed based on existing literature and the participant observation to clarify and explore further some of the key issues observed during the participant observation. Similarly, three stakeholders in the garment industry were purposively selected and interviewed on key issues from the participant observation with the garment manufacturers. The interviews were conducted in the offices of the participants and lasted for about an hour.

Thirdly, a survey was conducted with the consumers of the traditional dress to explore the meaning, evolution, sizing and mass customisation of the traditional dress. A content validated questionnaire was developed based on existing literature, participant observation and the interviews with the manufacturers and stakeholders. The sample

size consisted of 500 women between the ages of 20-54 years from three ministries and polytechnics selected through stratified sampling technique (seven age groups) based on the age group classification of the 2000 population census of Ghana. Piloting preceded the main survey and the questionnaire was administered through selected focal persons. Finally, focus group interviews were conducted to explore further and to strengthen the results from the questionnaire survey and sample was based on the age group classification of the questionnaire. A focus group interview was conducted in each research centre and consisted of fourteen members, two from each age group.

CHAPTER 5 Methodology for the Anthropometric Survey

5.1 Introduction

For the purpose of this study, an anthropometric survey was conducted to formulate a sizing system for the mass customisation of the Ghanaian traditional slit and kaba for women. It was necessary to collect data on the target group because of the lack in the current literature of information and reliable anthropometric data on the population. It is evident that no anthropometric survey has ever been conducted in Ghana and currently, there is no conceptual framework on the utilisation and exploitation of body measurement data. This is because there has never been a requirement for the slit and kaba to be mass customised but, as the outfit takes on more western features, the fit of the garment has become an important design parameter. There is, therefore, the requirement for a sizing system that provides a better fit through a process of systematic measurement of women's bodies. It is expected that this data will contribute to the expansion of knowledge and information regarding body measurement categorisation for traditional Ghanaian dresses.

This chapter is focused on the methodology for the collection of anthropometric data to categorise Ghanaian women's body types through the measurement of body dimensions. Included in this chapter are the definition of technical terms; the equipment and the procedure used to measure women's body in Ghana. The sampling procedure that was followed, the sampling unit, sample size and how the body measurements were selected for the survey, selection and preparation of subjects, the garments used, identification of landmarks and the recording of measurements are also discussed.

5.2 Ethical Procedures

Traditional anthropometry involves direct contact with the subjects in minimal clothing for landmarking and the measurement procedure. As a result ethical procedures are vital and necessary to protect the subjects whose body measurements are taken. Prior to the onset of the anthropometric survey for the current study, an approval letter from the principal of the researcher's institution in Ghana was obtained (see Appendix 12) to confirm to the participants that the researcher is a staff and was sponsored for the study. A pilot study was first conducted with 100 women to determine their interest and willingness to participate in the study and also their preference for undergarments was

assessed through a short interview detailed in Section 5.9. This was to address issues relating to cultural sensitivity and decency as body measurements are to be collected in undergarments. The findings led to the adoption of the short tights to cover the subject's pants and the hip area as explained in Section 5.9.1.

The subjects in the pilot as well as the main anthropometric survey were fully made aware of the purpose of the survey which was to develop a sizing system for the mass customisation of the traditional dress. Announcements for the recruitment for the survey were made on the local FM stations and the purpose was again explained to the public and as a result, participation by the subjects was voluntary. To reassure confidentiality and address ethical issues, verbal consent of each subject was obtained as a requirement in the Ghanaian culture before the commencement of the measurement procedure and to maintain anonymity, the data sheets were coded with reference numbers. It was also explained to the subjects that the final size chart would be owned by the government of Ghana and the researcher whereas the anthropometric data sheets would be destroyed. Private rooms were provided for the subjects to change into the garments for the survey and to ensure that the subjects were comfortable during the procedure, younger measurers took the measurement of younger participants and likewise older measurers were assigned to the older participants.

In relation to the use of the sticking spots for the location of landmarks on the subjects' body, the researcher observed its suitability for the survey by testing them during the pilot survey and as no reports were received on its reaction to the skin, they were assumed to be fit for purpose. However, the researcher left her contact details with her institution in Ghana for further contact should any problems arise. Verbal consent of all the subjects in the photographs was obtained and to maintain anonymity in the case of the photographs in Appendix 2, the face of the subject was not shown.

5.3 Definition of Equipment Used for the Anthropometric Survey

In this section, the equipment and terms used for the anthropometric survey are described based on existing literature (Pheasant, 1986; Roebuck, 1995; Beazley, 1997; Vronti, 2005).

Anthropometry: The measurement of the human physical dimensions in order to determine their body size and shape (Pheasant, 1986; Roebuck, 1995) the measurement of human physical dimensions such as size and the distance between anatomical points such as width, length and girth measurements (Tsang, Chang and Taylor, 2000).

Anthropometre: This is a series of detachable vertical interlocking rods of varying lengths with one or more sets of scale markings, and secondary scales mounted on right angles on fittings that slide along the primary rod. To ensure the rods are perpendicular a spirit level is attached by a magnet to the side of the measuring scale. The Anthropometre is used for measuring vertical lengths such as the height and inside leg.

Antibacterial wipes: Are used for hygienic purposes to clean all measuring equipment before each subject is measured.

Changing rooms: are changing facilities provided for reasons of modesty for subjects to undress and dress after the measurements.

Elastic tapes: Adjustable measuring tapes were attached round major girth measurements to locate measuring positions.

Electric digital scales: For measuring weight in kilograms of the subjects.

Landmarks: Are key sites on each subject's body that are used to locate the beginning and end of each measurement for certain parts of the body.

Landmarkers: Are coloured adhesive circles with a central cross marked on each and placed at the relevant positions of the body to locate the beginning and end of each measurement.

Measurer: the person who takes the subjects body measurements.

Metre rule: A metal metre rule to measure the hip level parallel to the floor.

Recorder: The person recording the measurements of the subjects

Recording sheet: The recording sheet developed for recording the body measurements of the subjects.

Spirit level: A device that indicates the perpendicular inclination of the body. This is placed on top of the Anthropometre to ensure it is perpendicular to the floor during the actual measurement.

Subject: The person being measured for the study. For the purpose of this study, the subjects were Ghanaian women between the ages of 20-54.

Tape measure: A retractable metal tip tape required to measure all girth and linear measurements.

Clip board: A hard board used to clip the anthropometric data sheets for the recording of the body measurements.

5.4 Justification for Equipment and Procedure for Data Collection

In conducting an anthropometric survey, it is important to select the equipment to be used, positions to be measured, appropriate garment and the sample. Pheasant (1990) suggests that 500 to 1000 subjects could be sufficient for an anthropometric survey.

Although there are new methods available in terms of collecting anthropometric data such as 3D body scanning technologies which capture data that are used to generate a three-dimensional image of the body, these equipment are expensive and beyond the reach of the researcher. The current survey was therefore conducted using traditional equipment and procedure. This survey followed guidelines set for undertaking anthropometric surveys by reputable international standards in order to make the results valid. As a result, this survey was carried out to conform to the ISO 8559 (1989) and BS EN 13402 (2001) standards respectively which describe manual measuring, landmarking and the type of undergarments to be used. The ISO 8559 guidelines have also been used in the UK (Kemsley, 1957; British Standards, 1990) and German surveys (DOB- Verband, 1994) are deemed to produce reliable results. The manual measuring procedure although laborious and time consuming is still used in studies where current technologies are not available.

The number of body measurements taken in any surveys may vary as this is mainly determined by the objectives of the study being undertaken. Based on the objectives of the current study which was to formulate a sizing system for the mass customisation of the traditional dress, 21 body measurements of the target group were taken using traditional equipment and procedure as presented in Table 5.2. This was against the background that, only measurements deemed necessary for the production of the traditional slit and kaba due to its design (long shaped skirt and blouse) were taken after literature review and the observation process. It is worth noticing that the slit and kaba does not require measurements such as the crotch, ankle girth and the knee girth that are required for the construction of other garments, for example the trousers. However, most basic body measurement needed for the drafting of the basic bodice, skirt and the

sleeve blocks were taken. In terms of selection of the number of measurements taken, the current study could be compared to a survey conducted in India (Gupta and Gangadhar, 2004) to develop a statistical model for body size charts where 21 body measurements, comprising nine linear and twelve girth measurements of 2,095 Indian women were taken from existing anthropometric data.

The subjects in the current survey were measured over their bra and the short tights provided due to concerns of decency and cultural differences as explained by Cameron (1984). This was done in accordance with the guidelines set in the ISO 8559 (1987) and BS EN 13402 (2001) standards which suggests that subjects could be measured in other garments provided they are not too bulky or too tight to constrict the body. Although the measurements were taken over the bra and short tights the results could be considered as appropriate since most parts of the body were exposed for landmarking which is a critical aspect of the measurement procedure.

In a survey conducted by Beazley, (1997) in the UK, 70 body measurements of 100 students between the ages of 18 and 28 were taken using traditional equipment to develop a size chart. As the sample size for this survey was small and the age group was not representative of the population, the results could not be generalised, but the measurement procedure followed was that of ISO 8559 standards and the equipment used are the same as those used for the current study. In this survey (Beazley, 1997) the subjects were not measured in their undergarments as suggested in the ISO and BS EN standards due to concerns of decency and as a result the subjects were measured in a full-length leotard. It could be argued that the use of full-length leotard although decent, covered most parts of the body therefore could make landmarking difficult. However this study could be compared to the current study in terms of equipment, procedure and the use of other garments apart from undergarments.

Goldsberry, Shim and Reich (1996) conducted an anthropometric survey in America of a sample of 6,652 women between the ages of 55 years and older. The objective of the study was to establish the first large-scale body measurement database of the target group. In this survey 58 body measurements of each subject were taken using traditional equipment over an Ultra Fit body suit developed by the researchers. The use of the bodysuit addressed concerns of subjects' modesty and can therefore be favourably compared to the current study. In another survey conducted in Kenya, Otieno (1999)

measured 618 children using the ISO (1989) and Beazley (1997) standards and procedure respectively. In this survey 32 body measurements were taken of children between the ages of 3-6 years of age using traditional equipment and methods.

Currently an anthropometric survey is underway in Croatia to measure the population in order to develop a size chart for clothing and footwear (Ujevic et al, 2006). This survey is expected to measure 30,000 subjects in the 20 Croatian counties including children and adults up to 82 years of age. This survey is being carried out in conformity to ISO 8559 and ISO 3635 standards, respectively using traditional equipment. One can however argue that the sample size for this survey is too large for the use of traditional equipment. Although the sample in the Croatian survey (Ujevic et al, 2006) is larger and the age distribution wider than that of the current study, it can be compared in terms of standards that are followed and equipment being used.

In another survey conducted in Cyprus (Vronti, 2005) to develop a size chart, 800 women between the ages of 18-54 were measured using traditional methods and equipment. In this survey, 37 body measurements of the 800 women were taken in their undergarments in accordance with the ISO 8559 standards. The current methodology favourably compares with the (Vronti, 2005) survey in terms of the target group, equipment and guidelines that were used.

5.5 Sampling Technique and Sample Size

Sarantakos (1998) suggests that a sample unit must be selected in a systematic and objective manner and must be clearly defined. The sampling unit for the anthropometric survey consisted of Ghanaian women between the ages of 20 to 54 years who are considered as the consumers of the traditional dress, slit and kaba. This age group was determined based on the categorisation of the 2000 population survey (Ghana Statistical Service, 2002). It was assumed that these women would have been actively employed and therefore can afford the slit and kaba. This group which was considered as matured would also have developed a sense of fashion, interest in dress and an orientation towards western and traditional dress.

Sampling is one the major issues of research designs as it is impossible in most cases to study the whole population. As a result it is necessary to adopt a suitable sampling procedure which enables the researcher to study a small number which is representative of the total population (Sarantakos, 1998). For the purpose of the anthropometric survey

which was conducted in three the three largest metropolitan cities in Ghana namely Kumasi, Accra and Takoradi, a sample was drawn from women between the ages of 20-54 years.

A stratified sampling technique was employed in order to draw a representative sample of 600 women from the target population. According to Pheasant (1990) 500-1000 subjects are adequate representative sample size for an anthropometric survey. The 2002 population census as shown in Table 5.1, (Ghana Statistical Service, 2002) already categorises the population into a number of age groups or strata and was therefore used as a sampling frame. In the case of this study a disproportionate sample was drawn based on the percentage distribution of women falling into each age group. Sarantakos (1998) noted that samples drawn in this way are very economical, present accurate results and has a high degree of representation. In most surveys one can use a sound methodological principle to select a random sample which is representative of the total population but this is not the case for an anthropometric survey which is based on subjects' willingness to participate (Patterson and Warden, 1983-84).

5.1:Population Sampling

	Actual Population				Sample			
Age Group	Western	Greater Accra	Ashanti	Total	Western	Gt. Accra	Ashanti	Total
20-24	83,493	164,690	162,094	410,277	28	55	54	137
25-29	81,578	151,801	146,144	379,523	27	51	49	127
30-34	64,918	115,736	117,282	297,936	22	39	39	100
35-39	53,486	94,171	98,945	246,602	18	32	33	83
40-44	41,957	73,227	78,992	194,176	14	25	26	65
45-49	31,889	55,174	58,361	145,424	11	18	20	49
50-54	25,815	41,873	48,390	116,078	9	14	16	39
Total	383,136	696,672	710,208	1,790,016	129	234	237	600

(Ghana Statistical Service, 2002)

5.6 Landmark Identification

The identification of landmarks is important in traditional anthropometry and determines the consistency and the reliability of the measurements that are taken. Landmarks serve as the end points of measurements and are normally located on a bony prominence or other physically identifiable points on the human body (Schofield, 2007). The following landmarks were located for the required measurements based on the BS EN 13402-1:2001 and ISO 8559: 1989 as presented in Appendix 2 and Table 5.2.

- Neck girth: Landmarks positioned 2cm below the Adams apple and the 7th cervical vertebra with the head bent forward (2)
- Shoulder Width: Landmarks were located at both acromion by feeling the bones beneath (2).
- Shoulder length: Landmarks were positioned at the neck point on the right side (where the neck and the shoulder are joined together) and the acromion (2)
- Across chest: Landmarks were located in front where both arms join the torso and the skin folds.
- Across Back: Landmarks were located at the back where both arms join the torso and the skin folds (midway between nape and scye level).
- Bust: Landmarks were located in front on the true bust point (nipples) by asking the subject to feel.
- Waist: The natural waistline identified between the top of the hip bones (iliac crests) and the lower ribs' with an elastic tape tied around.
- Lower hip: The widest part of the hip is located. Landmarks are placed on the centre front and back, and at the left and right sides measured equally from the ground with a metre rule (4).
- Upper hip: Located halfway between the lower hip level and the centre back waist level. Landmarks are located on the centre front and back, and at the left and right sides measured equally from the ground with a metre rule (4).
- 7th cervical: 7th cervical vertebra was located with the head bent forward (1).
- Upper arm: Landmarks are located on the outside arm at lowest scye level on the right arm.
- Wrist: Landmarks are located on the wrist-bone/ ulna bone (1).
- Acromion to wrist: With the subject's fist clenched and placed on the hip, and with the arm bent. The Landmarks are located on the right acromion, on the elbow at the olecranon and the wrist-bone/ ulna bone (3).

- Side waist to knee: The subject bends the right knee slightly to define the crease of the tibial knee joint space and landmark placed on the outer leg (1)
- Waist to ankle: Landmark on the lower edge of the tibial bone on the right ankle.

5.7 Body Measurement Procedure

In conducting an anthropometric survey, it is important to determine which parts of the body are to be measured and this is normally based on the aims and objectives of the study. For the purpose of this study which was to develop a sizing system for the Ghanaian traditional dress slit and kaba, it was important to understand the production system used in the manufacture of this dress. The body measurements selected for the anthropometric survey were based on related literature in anthropometrics and consisted of twenty-one body measurements.

The body measurement procedure and landmarking followed for the anthropometric survey were the guidelines set for carrying out anthropometric survey by BS EN 13402-1:2001, ISO 8559: 1989 and Beazley (1997) and these are presented in Table 5.2.

Table 5.2: Body Measurement Procedures

	Dimensions	Equipment	Position of subject	Measuring Procedure
1	Weight ISO 8559: 1989	Balance scale	Stands on balance scale	Measurer takes reading.
2	Height BS EN 13402-1: 2001	Anthropometre	Standing	Measure the vertical distance between the crown of the head and the soles of the feet, with the subject standing erect without shoes and with the feet together.
3	Neck girth BS EN 13402-1: 2001	Tape- measure	Standing	Measure girth of neck with tape measure passed 2 cm below the Adam's apple and at the 7^{th} cervical vertebra.
4	Shoulder width ISO 8559: 1989	Tape-measure	Standing with arms hanging naturally	Measure the horizontal distance between the acromion extremities with the arms hanging naturally.
5	Shoulder length ISO 8559: 1989	Tape-measure	Standing with arms hanging naturally	Measure distance from the base of the side of the neck (neck point) to the acromion extremity with the arms hanging naturally.
6	Cross chest ISO 8559: 1989	Tape-measure	Standing	The measurement is taken in front where the arms join the torso.
7	Chest girth BS EN 13402-1:2001	Tape-measure	Standing	Maximum horizontal girth measured during normal breathing with tape measure passing over shoulder blades (scapulae), under ampits (axillae), and across the chest.
8	Back width ISO 8559: 1989	Tape-measure	Standing	Measure the horizontal distance across the back half-way between the upper and lower scye levels.
9	Bust girth BS EN 13402-1: 2001	Tape- measure	Standing	Measure maximum horizontal girth during normal breathing with the subject standing erect and the tape-measure passed horizontally,

				under the armpits (axillae), and across the bust prominence.
10	Under bust girth BS EN 13402-1: 2001	Tape-measure	Standing	Measure horizontal girth of the body just below the breasts.
11	Waist girth BS EN 13402-1: 2001	Tape-measure and elastic tape	Standing	Measure girth of the natural waistline between the top of the hip bones (iliac crests) and the lower ribs' with the subject breathing normally and standing erect with the abdomen relaxed.
12	Lower hip girth BS EN 13402-1: 2001	Tape-measure	Standing	Measure horizontal girth round the buttocks at the level of maximum circumference.
13	Upper hip girth ISO 8559: 1989	Tape-measure	Standing	Measure horizontal halfway between the waist girth and the lower hip girth.
14	Thigh girth ISO 8559: 1989	Tape-measure	Standing	Measure the horizontal girth, without constriction, at the highest thigh position, with the subject standing upright.
15	Front waist length (neck shoulder point to waist) ISO 8559: 1989	Tape-measure	Standing	Measure the distance using the tape-measure, from neck point, over the nipple, then vertically straight to the waist.
16	7^{th} cervical to waist (Back waist length) ISO 8559: 1989	Tape-measure	Standing	Measure the distance using the tape-measure, from the 7^{th} cervical vertebra, following the contour of the spinal column, to the waist.
17	Upper arm girth ISO 8559: 1989	Tape-measure	Standing	Measure the maximum girth of the upper arm at lowest scye level, with the subject standing upright with arms hanging naturally.
18	Wrist girth	Tape-measure	Standing	Measure the girth over the wrist-bone with arms hanging naturally.
19	Acromion to wrist (arm length)	Tape-measure	Standing	Measure the distance using the tape-measure,

	ISO 8559: 1989			from the arm scye/shoulder line intersection (acromion), over the elbow, to the far end of the prominent wrist bone (ulna), with the subject's fist clenched and placed on the hip, and with the arm bent at 90°.
20	Waist to knee ISO 8559: 1989	Tape-measure	Standing	Measure the distance from the waist to the knee level
21	Outside leg length ISO 8559: 1989	Tape-measure	Standing	Measure the distance from the side waist to the ankle using the tape-measure, following the contour of the hip, then vertically down.

5.8 Recruitment and Training of Field Assistants

According to Roebuck (1995) it is important to train measurers to ensure consistency and proper use of techniques and equipment. In order to increase the validity and reliability of measurements (Cameron, 1982), 15 students from the Fashion Department of Ho Polytechnic were recruited and trained as measurers and recorders. The training manual used was the BS 13402-1 and ISO 8559 standards procedure which provides the line drawings for manual measurements as described in Table 5.2 which was also used in the study conducted by Beazley (1997). These students were trained over period of three days to identify body shapes, names and body locations or land marking and to measure body parts in line with BS 13402-1 and ISO 8559. It was also important to train these students to read measurements scales, measure weights, and handle equipment properly. These students were also introduced to the terminologies, equipment and subject preparation. The training of the research assistants include inter and intra measurement procedure for the researcher to assess all the measurements that was taken to ensure that the margin of error falls within the acceptable level of up to ≤ 0.5cm on length and short measurements and ≤ 1cm on full girth measurements as stated in Beazley (1997). The training procedure involved the researcher taking the measurements of a subject and comparing the results to the measurements of the trainees in order to check consistency as presented in Table 5.3. This error is allowed for the movement of subjects and the tension and the positioning of the tape measure.

At the end of the training ten out of the fifteen assistants (67%) which include two land markers, three measurers, three recorders and one person each to take the height and weight measurements respectively were recruited. The age of the measurers ranged between 20 to 35 years of age.

Table 5.3: Selection of Field Assistants

	Number of Trainees														
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Day 1 Identification of body dimensions and locations	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Day 2 Identification of landmarks. Inter and intra measurements	×	√	√	√	√	√	×	√	√	√	×	×	√	√	√
Day 3 Identification of landmarks. Inter and intra measurements	×	√	√	×	√	√	×	√	√	√	√	×	√	√	√
Selection	NS			NS			NS				NS	NS			
Total	**10**														

Acceptable range: ≤ 0.5cm on length and short measurements and ≤ 1cm on full girth measurements.
NS refers to trainees not selected

5.9 Anthropometric Pilot Survey

An anthropometric pilot study on Ghanaian women was conducted in January, 2005 to develop a reliable methodology for use in the main anthropometric survey. According to Moser and Kalton (1971) and Oppenheim (1992) pilot studies are conducted for various reasons such as to estimate the cost and duration of the main survey and to test the reliability of the data collection instruments among others. For the purpose of this study, piloting was done for the following reasons:

1. To test the suitability and reliability of the equipment.
2. To estimate the duration for measuring each subject.
3. To familiarise research assistants with the research environment.
4. To give research assistants the opportunity to practice taking of body measurements in real situations.
5. To test the response of the subjects to the data collection method.

In order to test whether the subjects would be willing to be measured in their under garments as suggested in the ISO and BS EN standards and procedure for conducting anthropometric survey, a short interview was conducted with 100 women who were randomly selected at Accra and Ho, all regional capitals in Ghana. The interview involved asking women between the ages of 20-54 the following:

1. Whether they would agree to participate in an anthropometric survey?
2. Whether they would like to be measured in their under wear?
3. If no, whether they would like to be measured in a pair of short tights to be provided by the researcher.

From the results of the above interviews, it was evident that due to concerns of modesty and cultural differences most (98%) of the subjects were not willing to be measured in their in panties although the majority (95%) agreed on the use of a bra. The researcher therefore had to select or develop suitable garments to be used for the survey.

5.9.1 Selection of Undergarment

In order to standardise the measurements for the anthropometric survey, it was necessary to select a suitable and reliable garment. Five students from the fashion department in Ho Polytechnic in Ghana volunteered as subjects for their measurements to be taken in their under garments. Three different garments were then selected which varied in fibre composition and elasticity. Measurements were then taken in the selected garments and these were compared with the measurements taken in the under garments. The results suggested that one of the garments was the most suitable in terms comfort and performance as it did not increase or constrict the body. Currently this garment is used by women in Ghana as an under garment and therefore could be considered appropriate for the survey. This garment is in the form of short tights to cover from below the waist to above the knee area. (See photographs in Appendix 2). This garment was selected in all the available sizes produced which included extra small, small, medium, large and extra large.

5.9.2 Method for Collecting Data for the Pilot Study

The pilot study for the anthropometric survey was conducted at the Fashion Department of the Ho Polytechnic in Ghana and included 60 women between the ages of 20-54 as specified for the actual survey. This was done in January 2006 ahead of the main

survey. Prior to the pilot study, a radio announcement was made on the local FM station to inform and invite women between the ages of 20-54 about the forth coming survey. This pilot studies was used to determine the willingness of subjects to participate in the survey, the duration for measuring each subject, the sequence of measurements and time management. Sarantakos (1998) states that pilot studies are a small replica of the main study and if done properly will eliminate administrative and organisational problems. Issues of modesty and cultural sensitivity were addressed and as a result a changing facility was provided for the subjects to undress and dress after the measurements were taken.

Prior to the data collection, all the subjects were briefed about the purpose of the study and what was involved. Each subject was then expected to answer the following questions in order to determine the suitability for the study. These included:

- Age
- Willingness to be measured over bra and garment provided
- Nationality

After meeting the required criterion the hip and bust measurements of each subject were measured to determine the size of bra and tights to be provided. The researcher and one field assistant placed landmarks on each subject before actual body measurements were taken. The measurements, which involved 21 body dimensions were taken by the trained assistants and recorded on each subject's sheet which was developed by the researcher (Appendix 6). At the end of the process each subject was thanked and the undergarments were given to them as incentives.

The pilot study proved beneficial in training the field assistants in a real anthropometric survey. The sequence of taking the measurements was also decided in order to reduce fatigue and the duration of the measurement process.

5.9.3 Recommendations from the Pilot Study

The pilot study on the anthropometric survey was useful in determining the number of measurements and the order to be followed, the appropriate garments to be adopted and used to train the measurers and the recorders for the main survey.

5.10 The Main Anthropometric Survey

The main anthropometric survey was carried out in three metropolitan cities in Ghana, namely Accra/Tema in the Greater Accra region, Kumasi in the Ashanti region and

Takoradi in the Western region between February and March, 2006. Measurement centres were located in each metropolitan city taking into consideration privacy of changing facilities. The same research assistants recruited for the pilot study were used for the main anthropometric survey.

5.10.1 Recruitment of Subjects

Prior to the commencement of the survey in all the three metropolitan centres, announcements were made on local FM stations to inform women between the ages of 20-54 about the anthropometric survey. Eligible subjects were described to be volunteers satisfying the following criteria:

1. Between the ages of 20-54;
2. Willing to be measured over undergarments and tights provided by the researcher;
3. Willing to come to the measurement centres;
4. Willing to spend about 30 to 40 minutes for the completion of measurements.

Subjects for the study were recruited through the radio announcements and by personal contact at the measurement centres. Each metropolitan centre was allocated a sample quota based on the 2000 population census in Ghana (See Table 5.1). As mentioned in (Section 5.5) recruitment of subjects for the survey could not be randomly selected as this was based on the willingness of the subjects to participate. However, recruitment of subjects was also based on the above listed criteria.

5.10.2 Preparation for Measuring

Preparation of subjects before the actual measurement is very important for accuracy of the measurements and also to develop rapport between the measurer, recorder and the subject. As the research team was unknown to the subjects, an attempt was made first to establish an interpersonal relationship or rapport with the subjects to set the stage for further interaction. Due to the sensitivity of the measuring procedure, the purpose and benefits of the survey and the measurement procedure was explained to each subject before the commencement of the actual measurement. This facilitated the interaction process and helped to win the trust of the subjects. To reduce participant effects such as inconvenience all the subjects for the study were measured in private rooms one at a time by the research team. In order to standardise the measurements and to ensure

consistency, the researcher provided short tights and bra for each subject as discussed in section 5.9.1.

Prior to the commencement of the measurement procedure, each subject's hip and bust measurements were taken in order to provide a suitable size of under garments in this case a bra and short tights. The bust measurements were based on the cup size whereas the hip measurements for the tights as shown in Table 5.4.

Table 5.4: Subjects Hip Classification

Size of Tight	Hip Measurement (cm)
Extra Small	<90
Small	90-99
Medium	100-109
Large	110-120
Extra Large	120-125
2 Extra Large	>125

5.10.3 Taking of Body Measurements

As a first step in the measurement procedure, landmarks were identified on the subject's body using the tape measure, elastic tape and coloured adhesive labels. As noted by Roebuck (1995, p. 25) key sites or landmarks should be located on each subjects' body by direct or indirect methods prior to the measurement procedure. The key anatomical points that were located on each subject's body for this study included the acromion, 7^{th} cervical, knee, wrist, elbow and ankle. In order to locate the waist line, an elastic cord was tied around the waist. It was necessary to locate these anatomical points to avoid confusion, to increase reliability and uniformity. For this study the land marking was done by the researcher and one field assistant using self-adhesive coloured stickers with central point located on each to increase consistency and reliability.

The equipment and procedure used in this study were based on those suggested by ISO 8559 (1989) and BS EN 13402-1 (2001) as described in Table 5.2. The anthropometre was regularly calibrated and tape measures were checked against the metre rule. 21 body dimensions were measured in total using traditional methods and instruments. The measuring procedure took approximately 25 minutes in total for each subject (from changing to taking of actual body measurements).

5.10.4 Recording the Measurements

The measurements for each subject from the anthropometric survey were recorded on a data sheet that was designed for the study (Appendix 6). In all, one measurer and a recorder worked together as a team. The recorders had a clip board with the recording sheets and were positioned at the left hand side of the measurers. To ensure accuracy the recorders repeated each measurement quoted by the measurers.

5.11 Data Analysis

Descriptive statistics was used to analyse the body measurements data (Beazley, 1998; Gupta and Gangadhar, 2004) obtained from the anthropometric survey using the SPSS (12). The mean average, median, mode, standard deviation, minimum and maximum for each body dimension was calculated as well as the percentile values to determine the spread of the range. The multiple correlation-coefficients were also examined to determine the relationship among the body dimensions in order to select the key dimensions which were used as the basis for the development of the size chart. Fit trials were conducted to validate accuracy of the size chart.

5.12 Chapter Summary

This chapter focused on the procedures used for the collection of anthropometric data and examined the equipment used, the recruitment and training of field assistants, selection of body measurements and garments, recruitment of subjects, preparation of subjects as well as the recording of body measurements.

The traditional equipment and procedure was followed for the anthropometric survey based on the guidelines of the ISO 8559 (1989) and BS EN 13402 (2001) standards on manual measuring, landmarking and the selection of undergarments in order to make the measurements valid and reliable. The sample size consisted of 600 Ghanaian women between the ages of 20-54 years considered to be enough for the conduct of anthropometric surveys as suggested by Pheasant (1990) which were categorised into seven age groups based on the 2000 population census of Ghana (Ghana Statistical Service, 2002). The selection of this age group was considered to be matured, developed a sense of fashion and interest in appearance management in terms of both western and traditional dress. The stratified sampling technique was used to categorise the age groups in order to draw a representative sample from the population. Prior to the conduct of the survey, field assistants were recruited and trained to ensure consistency

and to minimise inter-measurer variations which increased the validity and reliability of the results. A pilot study was conducted to test the equipment and to familiarise the field assistants to a survey situation and also to practice their newly acquired skills. The subjects for the survey were recruited through radio announcements based on the willingness to participate and be measured in the garments provided. Landmarks were positioned prior to the commencement of the measurements to increase consistency and reliability. 21 body measurements were taken based on the objectives of the study and the subjects were measured in a bra and short tights due to concerns of modesty and cultural differences. The measurements were recorded on the data sheet developed for the survey.

CHAPTER 6 Analysis of Participant Observation, Interview and Questionnaire Data

6.1 Introduction

In this chapter, the findings from the participant observation, interviews and questionnaire are presented. The first section of the chapter focuses on analysing the various aspects involved with the manufacture of the slit and kaba to evaluate the management of anthropometric data. This section was achieved through participant observational analyses and interviews with the manufacturers and stakeholders described in the methodology. In addition, some sections of the focus group analysis were utilised to contribute a consumer's perspective in relation to the management of anthropometric data. The second section focused on the evaluation of the traditional dress in relation to mass customisation achieved through questionnaire and focus group interviews with consumers. The findings were later triangulated with the literature review and sections of the interviews with the manufacturers and stakeholders.

6.2 Findings from the Participant Observation (Manufacturers)

An observation survey was undertaken in order to understand the processes involved in the manufacture of the slit and kaba in terms of the management of anthropometric data in relation to standardisation and mass customisation. This survey was carried out at three metropolitan centres namely Accra, Kumasi and Takoradi in Ghana involving twenty five garment manufactures in the micro-small scale industry. For the purpose of this study, an on-site observation was conducted in the workshops of garment manufacturers using a semi-structured observation guide (see appendix 03 for observation guide). The observation was carried out in six sections (A-F) and each section was analysed in that order. These include the companies profile in terms of the number of workers, target group, core business and location of the business workshops. Other aspects observed included the equipment in the workshop, sewing/construction techniques, types and details of garments that are made and how patterns for the garments are obtained. Knowledge in obtaining and utilisation of anthropometric data were also observed.

6.2.1 Profile of Companies

Twenty five companies were observed during the primary investigation in the three selected locations and were coded as described in Chapter 4. The results of each demographic area are presented in a series of Tables (6.1-6.3) categorising the number of employees (full time and part-time), defining the target consumer group, the location of the business and finally the core business in terms of clothing style, western or traditional.

It was observed from Table 6.1 that most of the enterprises in Accra with the exception of three had more trainee apprentices than full time workers. This suggests that the enterprises rely more on trainee apprentices rather that full time employees or professionals which may affect the quality of work produced. In terms of the location of the business premises, two manufacturers work from home with the other 23 situated in the city centre. The target consumer group ranged from women between the ages of 15-65 years and the core business is mainly women's wear, western and traditional dress but mostly the production of slit and kaba.

In Table 6.2, the profiles of eight enterprises observed in Kumasi are presented. Most of the employees were mainly trainee apprentices and the target group ranged from women between the ages of 18-65 years. All the manufacturers' business premises were located at the city centre and produced only traditional slit and kaba.

The profiles of the five enterprises observed in Takoradi are presented in Table 6.3. The majority of employees were mainly trainee apprentices and the target group ranged from women between the ages of 18-65 years. All the manufacturers' premises were located at the city centre and produced only traditional slit and kaba.

Table 6.1: Companies Profile in Accra

Manu Code	Education	Sex	Number of workers		Target group	Location	Core business
			Full time	Apprentice(s)			
AC01	HND	F	7	16	All age groups	City centre	Women's wear
AC03	Technical	F	5	15	15-55 years	City centre	Women's wear
AC05	Apprenticeship	F	1	10	15-60 years	Home	Women's wear
AC07	Apprenticeship	F	1	9	18-50	Home	Women's wear
AC09	Apprenticeship	F	25	5	25-60	City centre	Women's wear
AC011	University	F	21	2	18-60	City centre	Women's wear
AC013	HND	M	4	12	25-45	City centre	Women's wear
AC015	University	M	7	5	25-45	City centre	Women's wear
AC017	Vocational	F	1	18	15-60	City centre	Women's wear
AC019	Apprenticeship	F	2	14	18-50	City centre	Women's wear
AC021	Apprenticeship	F	4	6	18-60	City centre	Women's wear
AC023	Vocational	F	4	7	18-50	City centre	Women's wear

n = 12

Table 6.2: Companies Profile in Kumasi

Manu code	Education	Sex	Number of workers		Target group	Location	Core business
			Full time	Apprentices			
K025	Apprenticeship	F	2	10	18-60	City centre	Women's wear
K027	Apprenticeship	F	3	7	18-60	City centre	Women's wear
K029	HND	F	1	10	18-60	City centre	Women's wear
K031	Vocational	F	2	13	18-60	City centre	Women's wear
K033	Apprenticeship	F	2	11	18-60	City centre	Women's wear
K035	Apprenticeship	F	3	12	18-60	City centre	Women's wear
K037	Apprenticeship	F	3	8	18-60	City centre	Women's wear
K039	University	F	4	15	18-65	City centre	Women's wear

n = 8

Table 6.3: Companies Profile in Takoradi

Manu code	Education	Sex	Number of workers		Target group	Location	Core business
			Full time	Apprentices			
T041	Apprenticeship	F	1	11	18-60	City centre	Women's wear
T043	Apprenticeship	F	1	9	18-60	City centre	Women's wear
T045	HND	F	1	10	18-60	City centre	Women's wear
T047	Technical	F	1	11	18-60	City centre	Women's wear
T049	Vocational	F	3	9	18-65	City centre	Women's wear

n = 5

In general, the use of trainee apprentices was evident in the observation and although majority of them provided labour, these were not paid for. The target groups for all the manufacturers are similar in terms of age classification which suggests traditional dress remains an important part of the Ghanaian culture. Another observable practice was the location of these enterprises which were mainly in the city centre with the exception of two which operated from home. It was observed that the majority (23) of the manufacturers were women and their ages ranged from 24-50 years as discussed in Chapter 4. In terms of education, three had acquired a university degree, four a Higher National Diploma from the polytechnic, two with technical school certificate, four vocational school qualifications and the majority (12) acquired training through apprenticeship in the informal sector. More than half (15) of the participants were married. The slit and kaba was one of the main garments produced by the manufacturers although a minority of them produced other forms of traditional and western garments.

6.2.2 Equipment for Slit and Kaba

In order to have an insight into the production of the slit and kaba, the type and number of equipment owned by the manufacturers were observed and are presented in Table 6.4. The result revealed that most of the manufacturers had one or more industrial sewing machine with the exception of six which rely mainly on domestic electric and hand sewing machines. The results suggest that most of the manufacturers relied heavily on domestic equipment rather than industrial equipment with the exception of AC09, AC011, AC013 and AC015. As a result of the type of equipment owned, most of the manufacturers may be classified as home manufacturers and therefore cannot handle large volume of orders.

In terms of specialised equipment, it was evident from the observation that only one of the manufacturers had industrial cutting equipment whereas the other twenty four relied on basic cutting out shears. The result also indicates that none of the manufacturers had an industrial pressing equipment and pattern making software. However, in terms of other auxiliary equipment, a few of the manufacturers had embroidery machines.

Table 6.4: Sewing Equipment in the Workshop

Manufacturer's Code	Industrial Sewing Machine	Domestic Electric Sewing Machine	Domestic Hand Manual Sewing Machine	Industrial cutters	Embroidery machines
AC001	3	2	20	-	-
AC003	2	4	15	-	-
AC005	1	0	16	-	-
AC007	0	4	10	-	-
AC009	17	10	5	1	2
AC011	10	15	6	-	1
AC013	8	3	7	-	1
AC015	8	5	0	-	1
AC017	3	0	18	-	-
AC019	0	2	14	-	-
AC021	2	2	6	-	-
AC023	2	0	9	-	-
K025	4	0	8	-	-
K027	1	4	5	-	-
K029	0	4	8	-	-
K031	1	2	13	-	-
K033	1	1	14	-	-
K035	2	4	12	-	-
K037	3	2	6	-	-
T039	1	1	10	-	-
T041	0	1	9	-	-
T043	0	1	10	-	-
T045	0	1	11	-	-
T047	3	0	9	-	-
K049	3	2	15	-	-

n = 25

The findings revealed that the equipment used by the manufacturers was mainly basic sewing equipment and manufacturers in Accra own more industrial machines than the other two localities. The majority of the manufacturers relied more on domestic basic equipment than advanced industrial ones. This may be a result of the fact that most of these enterprises started as home business and moved out to the city centres in order to increase their customer bases. The reliance on domestic equipment may however hinder efficiency and large scale garment production. It has been found in literature that the adoption of mass customisation requires the use of advanced and enabling technologies. The finding of this study implies that for mass customisation to be successfully

employed in the production of the traditional dress will require a complete change of the equipment from domestic to advanced technology.

6.2.3 Type of Garments Produced

Garment products in Ghana can be classified into two distinct groups namely: traditional and western style garments. Traditional garments are made in local fabrics and designs and are produced in several small companies mostly run by owner managers which were used as the target group for the participant observation. Western style garments are made in western fabrics and designs and are also sometimes made in local fabrics.

It was observed that in terms of the slit and kaba two types were produced which are those selected from local catalogues and have more traditional features. Also there are those selected from western styled catalogues and may be termed as hybrid which implies a blend of traditional and western designs. It was also observed that western dresses and other traditional dresses such as boubous were also produced however the focus of this observation was mainly centred on the production of the slit and kaba.

6.2.3.1 Traditional Slit and Kaba from Local Catalogues (Traditional Slit and Kaba)

The traditional slit and kaba include two pieces of rectangular fabrics (two yards) each and a kaba mostly semi-fitted to loose or sometimes with a straight loose slit and a cover cloth. The traditional slit and kaba is mostly preferred by the elderly and the styles were mainly selected from traditional styled catalogues which are designed and produced in Ghana. These styles tend to be classic in nature and were made in wax and fancy prints although other African prints were used.

In terms of fashion details observed on the traditional slit and kaba include different shapes and widths of necklines such as the round, square, the V among others were used for the traditional kaba and these were mainly low and wide. The size and depth of the neckline however varied according to individual customer preferences. The two main types of sleeves used for the traditional kaba are the set-in and raglan sleeves. The sleeves were flared, gathered, rouched, pleated or left plain. The length of the sleeve was determined by prevailing fashion and individual customer preferences. There were

different shapes of yokes used for the traditional kaba which were also sometimes rouched, gathered, tucked or embroidered. These yokes were mainly cut above the bust line with the bodice gathered, pleated, rouched or cut on the bias and set into the yoke. There were however no fastenings on the traditional kaba as they were not fitted and the necklines were mainly low and wide. The trimmings used include lace strips, bias binding, ribbons and cords and the style of traditional slit made include the traditional straight house-wife type of slit.

6.2.3.2 Traditional Slit and Kaba from Western Catalogues (Modified Slit and Kaba)

The modified traditional slit and kaba from western catalogues include a long ankle-length skirt (slit), a cover cloth and a tailored blouse (kaba) which incorporates certain western features. This type of slit and kaba is mainly preferred by young and middle aged women who have developed a sense of western fashion. From the observation, most of the designs under this category were fitted and semi-fitted and include western designs. The fabrics used for the modified slit and kaba in order of preference include wax and fancy prints, batik, tie and dye, lace, kente, aso-oke and other western fabrics. Designs were selected from magazines, newspapers, manufacturers and customers' creative ability and western catalogues.

The fashion details observed on the modified traditional slit and kaba include different shapes and widths of necklines which were used for the kaba. Theses necklines were mainly wide and low with exception of designs for older customers. Collars such as mandarin, bertha, halter necklines and bias-cut capes were also produced. These styles were in fashion at the time of the observation. In terms of sleeves, the long raglan sleeves cut on the bias grain were in fashion at the time of the observation. Although other styles of set in sleeve were also made, sleeves were mainly cut on the bias grain and cut-away armholes were also made with some fitted designs.

Princess and panel seams were used to shape fitted kaba some of which were made in the form of bustier and strapped/strapless designs which were in fashion at the time of the observation. These fashion details were however produced on other fitted bodices and in some cases, the seams were boned. The empire seam designs were in fashion at the time of the observation and were mainly made on fitted designs in different shapes

and widths to emphasise the waist and the bust lines. The bias grain effects were in fashion at the time of the observation and both the slit and kaba were cut on the bias grain to create different effects on fitted and semi-fitted designs.

It was observed that the slits were mainly made in the form of western skirts of which some were cut above or below the knee and joined with frills or flounces. The upper sections of such slits were very fitted and had darts, zippers and finished with waistbands. These designs were in fashion at the time of the observation.
The types of fastenings used on the modified traditional kaba depended on the fit and design which included invisible zippers and eyelet and cords which were in vogue at the time of the observation. Button and buttonholes and button and loops were out of fashion at the time of the observation. The trimmings used were however loud and bold and included feathers, decorative braids, lace strips, chain straps on strapless designs and eyelet and ribbons.

6.2.3.3 Western Garments

Western style garments are also produced in Ghana alongside traditional garments. Most of the manufacturers observed do not produce western style garments however those who produce these types of garments only produce casual to semi-formal designs which include skirt and blouses, dresses and trouser and blouses. Western fabrics as well as local fabrics were used and designs were mainly selected from western style catalogues. Although these types of garments were also produced by some of the manufacturers that were observed, this type of dress is outside the scope of this study.

Other traditional dresses such as boubous and kaftans were also produced. These garments were made in fabrics such as tie and dye, batik, fancy, wax prints, lace and linen. Designs were selected from traditional style catalogues and magazines. These dresses are also outside the scope of this study.

The results of the observation revealed that two systems of dress are used by women in Ghana namely traditional and western type dresses. Traditional dresses are mainly made in traditional fabrics whereas western designs are mainly produced in western fabric although traditional fabrics are also used. The findings further revealed that the slit and kaba may be divided into two groups namely traditional and the modified slit and kaba.

The traditional slit and kaba is made in local fabrics and the designs are mainly selected from traditional styled catalogues. Modified traditional slit and kaba however incorporates certain western features and is mainly produced in local fabrics, although western fabrics such lace are also used. The designs for the modified slit and kaba are sometimes selected from western style catalogues and include design details such as collars, sleeveless and strapless designs among others. In conclusion, there is clear evidence that the traditional dress has evolved in relation to form and fit which suggest that culture is not static but often undergoes changes.

6.2.4 Sewing and Construction Techniques

In this section the results of the on-site observation on construction techniques are presented which include the sewing process of the slit and kaba such as seam construction and finishes that are applied to the garment.

In terms of laying and cutting out procedures it was observed that most of the manufacturers prepare the fabric before cutting out by looking for flaws and pressing the fabric in order to remove fold lines and unwanted creases. It was however observed that most of the manufacturers do not always match motifs in the fabric before cutting out is done which results in ill-matched motifs and only five out the twenty five of the manufacturers observed align the motifs/patterns in the fabric when cutting out. This may be a result of the fact that most of the manufacturers use the free hand cutting technique where the patterns are plotted directly on the fabric rather than on paper.

It was generally observed that, cutting out on the right grain line was determined by the motifs in the fabric as well as the desired effect. It was observed that most of the manufacturers do not have knowledge especially in cutting on the straight grain (warp thread). However most of the motifs in the traditional local fabrics are placed in the direction of the weft grain and also border designs which makes cutting on the warp grain impossible. This is because the selvedge of the fabric when wrapped around the body or sewn into a slit is meant to be at the waist and ankle levels. None of the manufacturers use any powered cutting tools. The basic scissors is used for all the cutting out process. The cutting out was mainly done by the owner manager and a book is kept with the measurement of all their customers and sometimes with the sketches of

selected styles and fabric swatch. The basic cutting out shears was used by all the manufacturers and one garment was cut at a time.

The sewing machine was mainly used in terms of seam constructions and it was generally observed that, the whole garment system of production was used mainly by the flat method of joining garment pieces together. In terms of shaping materials processes, the underlining technique was mainly used which is achieved by handling the garment and shaping fabrics together as one. This method of utilisation of shaping materials is easier, faster and more convenient in terms of garment alteration and level of difficulty. In terms of seam finishes, closed seams were mainly used and the raw edges were finished with the surging machine. In addition to the above the following were also observed:

1. Large side seam allowances up to 5cm were left on the kaba.
2. Some of these wide side seam allowances were finished as closed seams which made the shape of fitted garments not to come out properly especially at the side seams.
3. Not much attention was paid to the finishing of the wrong sides of the garments.
4. Kaba were cut without shaping the side seams. This was done after the darts and panel seams were stitched.
5. A lot of the fabric was wasted when free hand cutting was used and motifs were poorly aligned.
6. Garments were mainly produced by the trainee apprentices under the supervision of the owner managers or senior apprentices and this sometimes affected the quality of the garments.
7. There are no standardised procedures that were followed for the manufacture of the slit and kaba

The findings revealed that almost all the manufacturers prepare the fabrics in a way before cutting out is done which include checking out of flaws in fabrics. Cutting out was mainly done by the owner managers which implies the importance attached to this process however most of the manufacturers do not always match motifs in the fabric which may affect the aesthetic quality of the garments produced. Furthermore, the findings revealed that most of the manufacturers do not have adequate knowledge on the effect of cutting on the right grain which affects the fit as well as well as the aesthetic attributes of the traditional dress. The findings further revealed that the flat

method of joining garment pieces together was mainly used with seams generally closed and finished with a surging machine. The use of wide closed seam may affect the shape of the garment especially at the side seams. In terms of shaping materials processes, the underlining technique was mainly used which is considered as easier, faster and more convenient in terms of garment alteration and level of difficulty by the manufacturers.

6.2.5 The Use of Anthropometric Data

In this section, the results of the utilisation and the method of obtaining anthropometric data are presented. As stated in Section 5.1 Ghana has never conducted a national anthropometric survey, therefore has no sizing system however some garment manufacturers adopt sizing systems from other countries. Although Ghana does not have a sizing system, most of the manufacturers observed were aware of at least one international sizing system; the British or American sizing systems.

The results of the observation indicate that all the manufacturers obtain anthropometric data by measuring their customers in order to produce custom made garments. The number of measurements taken varied among these manufacturers although the key dimensions (bust, waist and hip girths) were taken by all of them. The findings in Table 6.5 represent the frequency of the measurements that were taken by the 25 manufacturers for the manufacture of slit and kaba. Among these measurements, the bust girth, waist girth, lower hip girth, front waist length, wrist and the side waist to ankle were taken by all the manufacturers.

The results also shows that, the height, weight and the thigh girth measurements are not taken by any of the manufacturers. This could be because most of the manufacturers observed produce mainly the slit and kaba which does not require the thigh measurement for its fit. However, one would expect that since most of them produce fitted kaba, measurements such as the shoulder length and width, across chest and back and the 7^{th} cervical to waist measurements should be utilised by all the manufacturers in order to achieve good fit. In terms of the number of measurements taken, the findings revealed the same are taken for both traditional and western styled designs as most of the manufacturers produce more of traditional slit and kaba.

6.5 Frequency of Manufacturers and the Number of Body Measurements

	Body Dimensions	Frequency of Measurements Taken (n=25)
1	Weight	0
2	Height	0
3	Neck Girth	1
4	Shoulder Width	7
5	Shoulder Length	14
6	Across Chest	11
7	Chest Girth	2
8	Across Back	18
9	Bust Girth	25
10	Under Bust	1
11	Waist Girth	25
12	Lower Hip Girth	25
13	Upper Hip Girth	0
14	Thigh Girth	1
15	Front Waist Length	25
16	7^{th} Cervical to Waist	9
17	Upper Arm Girth	21
18	Wrist Girth	25
19	Acromion to Wrist	1
20	Side waist to Knee	16
21	Side waist to Ankle	25

In terms of the utilisation of anthropometric data, the results revealed that the measurements taken from the individual consumers from their target groups are used to produce custom made garments. It was observed that 20 out of the 25 manufacturers solely obtained patterns for their garments through the free hand cutting technique. However, five manufacturers utilise flat patterns in addition to the free hand cutting technique for more complicated and difficult designs. The observation revealed that, this technique of obtaining patterns for garments although fast and convenient has several disadvantages or drawbacks such as fabric wastage as the designs are directly plotted on the fabric, mistakes are not readily detected and therefore if not correct, the fabric may be spoilt, patterns cannot be reused when styles have to be reproduced and finally, it does not promote standardisation of similar designs and sizes

It was also observed that none of the manufacturers use any software for pattern making and other methods such as modelling or draping are not used. Manufacturers who utilise flat pattern drafting technique prepare patterns for each customer from basic blocks that have been developed for their use.

6.2.6 Summary of Participant Observation Findings

The findings indicated that the core business for all the manufacturers was traditional dress and business premises were situated in the city centre. The consumer target group ranged from 15-60 years which underlines the wide usage of the traditional dress within the Ghanaian society. The production of the slit and kaba was mainly female based which indicated a gender specific occupation. The manufacturers relied more on trainee apprentices rather than full time employees which is a characteristic of the informal sector in Ghana and most of the manufacturers had acquired some form of formal education.

It is evident that most of the manufacturers rely on domestic equipment than industrial which signifies the level of this enterprise in terms of technological advancement with exception of four enterprises in Accra. The use of specialised equipment is limited to embroidery machines which imply that only basic sewing procedures are undertaken.

It is reasonable to conclude that two types of dress are used by women in Ghana namely traditional and western type dresses. Traditional dresses are mainly made in traditional fabrics whereas western designs are mainly produced in western fabric. The findings further revealed that the slit and kaba may be divided into two groups namely traditional and the modified traditional slit and kaba and that traditional slit and are mainly selected from traditional styled catalogues whereas modified traditional slit and kaba incorporates certain western features. One can therefore conclude that the traditional dress has evolved and taken more western features which have affected its fit and form.

Cutting out was mainly done by the manufacturers however most of them do not match motifs in the fabric before cutting out is done which results in ill-matched motifs which affects the aesthetic quality of the garments produced. Furthermore, the findings revealed that most of the manufacturers do not have adequate knowledge on cutting on

the right grain of the fabric which may affect the set and fit of the garments. In terms of shaping materials processes, the underlining technique was mainly used which may be as a result of the fact that this method is easier, faster and more convenient in terms of garment alteration and level of difficulty.

The manufacturers obtained anthropometric information by measuring their individual customers and the same number of measurements is taken for both traditional and western styled designs. Although the manufacture of the traditional dress does not require the thigh measurement for its fit, it was observed that certain vital body measurements such as the shoulder length and width, across chest and back and the 7th cervical to waist were not obtained from the consumers and this may have an adverse effect on the fit of the traditional dress. In terms of the utilisation of the anthropometric data, most of the manufacturers use the free hand cutting technique to obtain patterns for their garments and only five manufacturers use the flat pattern drafting technique.
The use of basic equipment may hinder mass customisation if this strategy is to be adopted for the manufacture of the slit and kaba as mass customisation employs the application advanced technology. However, as the slit and kaba is already produced as a custom made garment, the adoption of mass customisation will be a natural progression in order to facilitate its manufacture. The reliance on trainee apprentices rather than qualified employees or professionals may affect the quality of work produced in relation to standardisation and mass customisation.
In relation to the management of anthropometric data, the use of freehand cutting technique will not promote the standardisation of the manufacturing process which is necessary for the achievement of good fit and quality standards. In order to adopt the mass customisation strategy, there is the need to employ well qualified manufacturers and state of the art equipment for the manufacture of the slit and kaba to ensure that quality and good fit is maintained.

6.3 Findings from the Interviews

For the purpose of this study, interviews were conducted with twelve garment manufacturers to clarify certain practices observed during the participant observation and also to generate data on their views about the development of a Ghanaian sizing system as well as the mass customisation of the traditional dress. The subjects for the interviews (manufacturers) were the same sample observed for the participant

observation. Three stakeholders in the garment industry were also interviewed as well as three focus group interviews were conducted with consumers of the slit and kaba. In gathering data, a semi-structured interview guide was used as already discussed in section 4.4.1. The analyses of the data generated from the participants are presented under the general/main themes of the semi-structured interview guide. These include:-

1. Meaning and utilisation of traditional dress
2. Evolution of traditional dress
3. Manufacture of traditional dress
4. Development of a sizing system
5. Mass customisation of the traditional dress

In terms of meaning and evolution of the traditional dress, the same questions were asked the manufacturers and stake holders therefore the findings represent the general views. As a result all the subjects were referred to as participants. However, different questions were asked the various groups in terms of the manufacture, development of a sizing system and mass customisation of the traditional dress.

6.3.1 Meaning and Utilisation of Traditional Dress (Manufacturers and Stake Holders)

For the purpose of this study, interviews were conducted with twelve garment manufacturers to clarify certain practices observed during the participant observation and also to generate data on their views about the development of a Ghanaian sizing system as well as the mass customisation of the traditional dress. The subjects of the interviews with the manufacturers were the same sample observed for the participant observation. Three stakeholders in the garment industry were also interviewed. In gathering data, a semi-structured interview guide was used as discussed in Section 4.4.1.

6.3.2 Meaning and Utilisation of Traditional Dress (Manufacturers and Stake Holders)

The findings suggest that the participants attach several meanings to the traditional slit and kaba which may influence the usage of this dress item. Although participants varied in their responses, there were more similarities in defining traditional dress. For most of the participants, the meaning of traditional dress relates to either national or ethnic

identity which is evident from their statements and strengthens the relationship between usage/heritage and associated meaning. Five participants viewed the slit and kaba as a cultural dress which is a way of dressing typical to Ghanaians and worn to depict their roots and backgrounds. Two participants explained the meaning of traditional dress as the preservation of cultural values and heritage. The views of the participants can be linked to cultural heritage which may be seen in the following excerpts:

> A type of dress that identifies people with their background and tradition. It makes people look different and look special and it identifies with where they are coming from. People wear traditional dress to show that they have not forgotten their roots (MANU 014).

> For me a traditional dress is a type of garment used by a particular ethnic group for instance the slit and kaba in my opinion is a dress that is associated with an ethnic group or a society. People wear this dress for identification, preservation of cultural values and heritage (STH 05).

> Traditional dress is the way Ghanaians dress which is typical to us. You see from the time that we started wearing clothes, every culture has a way of dress so that which is typical to us for example the slit and kaba for women and the cloth that our men drape on their shoulders (MANU 022).

Another use of traditional dress is communications about the self or the wearer to other observers as to whom one is. It is evident from the findings that the meanings assigned to the slit and kaba includes social identity which is communicated through the usage of the slit and kaba. The findings further suggest the manner in which the traditional dress is worn may reveal the mood of the wearer and signifies 'where you are' in relation to the ranks within the society. Data gathered also revealed that the participants wear slit and kaba in order to look matured, responsible and to enhance ones confidence. As seen from these statements, the usage of dress is expressed through the form and function and defines who one is and where that person is in relation to a particular society as shown in these excerpts:

> .....it communicates a lot for example our culture, your status in society, whether you are married or single, whether you are an adult or a child, traditionally we all have a way of dressing that depicts your age, what you do and where you come from (MANU 02).

> .....it communicates uniqueness and preservation of culture and even though the world is now a global village preserving your cultural values does not mean you are backward. It also identifies you as a Ghanaian woman and the colour of the cloth can tell the mood of the person, identifies the ranks, the way we wear it. For instance the colour of a funeral cloth is different from that of an engagement (MANU 08).

It is also evident from the findings that the slit and kaba is mainly produced in traditional fabrics which are termed African prints, "A dress made up in local fabric that has a traditional link like our slit and kaba" (MANU 04). Most of these fabrics are locally produced by the textile companies as explained by a stake holder in the textile industry:-

> I think for most people the concept of slit and kaba is best interpreted in African prints and on top of the range is wax prints so people will always want to use African prints and kente has also gained more prominence in usage and you'll find more use of the kente and a shift from the traditional colour schemes and more and more people are using it although they are very expensive people are using it (STH 01)

Another participant described the meaning of slit and kaba as depicting traditional link and self worth or self esteem as follows:

> A dress made up in local fabric and has a traditional link like our slit and kaba. We now want some identity for ourselves and we also want people to know our worth through the traditional fabrics and clothes and we are paying more attention and interest in that now (MANU 06).

The findings further suggest that the fabrics that are used for the slit and kaba have symbolic meanings that convey a message about the wearer therefore may influence its preference and usage. For example "a cloth named ABC will be mostly preferred by the educated elite to signify that the wearer is educated". This cloth has motifs of alphabets, numbers, chalk, pen and blackboard with sentences written on in it. Education in Ghana is viewed as being scholarly, modern, well cultured and civilised which is desired by most people. Majority of the participant are of the view that most local (traditional) fabrics are named to signify the status of the wearer or the mood of the occasion and may be viewed symbolic as described by this participant:

> .....the fabrics convey a message as they are all named and have meanings which have significance, so in our culture we have names for the prints. Most of the prints have proverbial meanings some of which depicts status symbols and other names depict personality. For instance somebody wears a print named 'katawodieso' literally means (cover your issues) is a proverb. In the olden days people buy wax prints because of their names which has significance in our culture, people did not buy ordinary prints but now people just buy because of the colours. Formally even if the colour is not attractive people will buy it because of the meaning of the design (MANU 02).

The above statement may however suggest a change in the current trends in relation to the symbolic meaning of names of fabrics and its preference. Another participant described the symbolic meaning of traditional fabrics in relation to the occasion from her father's personal experience as follows:

> ..... a cloth with a meaning will suggest when it is worn. For example my father wore a cloth for a funeral and did not look at the symbols but it was for mourning so when he got there someone saw it and said, oh! You did not check the meaning of the symbols

> because it did not match the occasion as it talked about joy when they were mourning (MANU 04).

From the above excerpt one will note the importance attached to the meanings of symbols and motifs in a cloth within the Ghanaian cultural context which may not be visible to a non-Ghanaian or a visitor. This underlines the symbolic meanings of the fabrics used for the traditional dress which results in the naming of all the prints.

It is also evident from the findings that the traditional dress may be worn to depict modesty as explained by two of the participants. It looks as if because this dress covers most parts of the body that is from the shoulder to ankle, one is able to deduce modesty from its function. One can however argue that modesty is culturally constructed and may vary amongst or within cultures depending on the parts are of the body that are covered within a particular society.

Although this dress is mainly used for traditional functions it is evident from the findings that there is increase usage especially for non-traditional functions. In addition, the slit and kaba may be mostly used by the elderly and married women and may be considered as a gender-specific dress worn in Ghana to define ones role as a woman and its linkage to maturation and womanhood as explained in the following statements:-

> ..... in the past once a woman got married she was suppose to change her dressing style and would be expected to use more and more of slit and kaba and also in those days practises like carrying babies at your back will influence the way you dress. Slit and kaba was very appropriate for that kind of relationship with our young children.... (STH 01).

> Well, the traditional dresses are so prescribed because that is known to be the first choice of our people. If you ask a Ghanaian for an outing for a special occasion as a traditional function you are sure a lady coming in kaba and slit so that is how we have come to accept kaba and slit as the traditional dress for the average Ghanaian woman STH 03).

In terms of usage of the slit and kaba it is evident from the data gathered that the slit and kaba is a prescribed dress for women and it is mainly used for traditional functions. This dress may be worn for both formal and informal functions depending on the fabric used and its design. In general the occasion determines the type of dress worn although dress codes may be sometimes prescribed as described by the following excerpts:

> .....people tend to wear the slit and kaba to church and other special occasions where it is prescribed. Elderly people tend to wear the slit and kaba to reflect their age but the youth wear it mainly to church and other special occasions (MANU 02).

> I think the occasion mainly influences the choice of dress for instance if it is traditional functions like funerals, engagements people will rather be in a slit and kaba than a dress. Currently people wear slit and kaba to weddings and now there is a policy on traditional Friday wear so people wear the slit and kaba to work to promote made in Ghana goods (MANU 024)

In relation to usage by the different ethnic groups, the participants are of the view that the only difference amongst these groups are the choice of cloth in terms of the name of the print, colour symbolism and usage for the various occasions especially funerals as may be seen from this excerpt:

> You only see that during funerals as Ewes do not wear black for mourning but a typical Ashanti will wear black, dark brown or red and the Ga's wear white because of how each tribe think of death (MANU 06)

The participants are of the view that, choice of style for most people is mainly determined by the cost of the cloth and individual preferences and do not vary among the various ethnic groups. For example, expensive wax prints, kente and lace may be used for classic styles that never go out of fashion but cheaper prints and laces may however be sewn into fashionable designs that easily go out of fashion.

However three of the participants suggested that an individual's religious background may influence the choice of style as explained in this statement ".....the Muslims wear loose dresses because what I know is that their men do not like the women to expose their shapes (figures) due to religious values" (MANU 02). This is an evidence of the effect of religion on the choice of style and could be linked to the strict dress codes prescribed for women by some religions.

From the above statements one would observe that the slit and kaba is a socially prescribed dress for Ghanaian women and its usage is determined by the occasion especially traditional functions where there are strict dress codes.

6.3.3 Summary of Findings of Meaning and Utilisation of Traditional Dress

The findings on the meanings of the traditional dress indicated that there are several meanings attached to the traditional dress slit and kaba in Ghana which are cultural and social. The meanings include Ghanaian identity, cultural heritage, status, reflection of age among others which underpins the relationship between usage and associated meaning. Considering the fact that one of the functions of dress is communication, the

findings reiterate the role of the traditional dress in the establishment of the social identity of the wearer which may facilitate interaction within the society.

The findings further revealed that the traditional dress is mainly produced in traditional fabrics which have symbolic meanings and conveys messages about the wearer. Therefore, the meaning of these fabrics influences its preference and usage which may not be visible to the outsider as they are cultural and only understood in the society from which it emerges.

In terms of usage of the traditional dress, the findings suggest that the traditional dress may be used for modesty functions as it covers most part of the body although it is debatable that the part of the body that is covered is culturally constructed. It is also evident from the findings that the traditional dress is mainly worn for traditional functions which strengthen its classification as a traditional dress. There is also evidence that the traditional dress is mainly worn by married women and is considered as a gender specific dress. This dress may be worn to define one's role as a woman and it is linked to woman hood and maturation as it reflects the age of the wearer. However, there are no significant differences among the ethnic groups in terms of usage except in fabric and colour symbolism. The choice of style is determined by the value of the cloth and individual preferences although the individual's religious background may influence the choice of style as in the case of strict code of dress prescribed for Muslim women.

6.3.4 Evolution of Slit and Kaba (Manufacturers and Stake Holder)

The findings reveal that in terms of evolution of the traditional dress, the slit and kaba has undergone some changes in relation to design features and fabrics usage. It is evident that several factors such as western dress, both the print and electronic media as well as technology have contributed to the change in the form and fit of the traditional dress. A participant stated that "the western media has influenced this change and people have realised that western styles can be adapted to the slit and kaba so they are copying it" (MANU 04). Most of the participants are of the view that the slit and kaba has been transformed over the years and looks more like western dress which is linked to the above listed factors as may be observed from the following statements:-

> ..... but I think it's the people who try to interpret the African print as it will not be too different from the known western type of garment and if you look at what has happened over the past 10 years you can see that there is the reduction in the gap of

what the western type of dress looks like and the slit and kaba as a traditional dress of today. I think they are becoming more and more alike and the designers are trying to interpret the African fabric in a way that will not be too different from the western garment which appears to be the trend and people are now trying to make the slit and kaba look like a western garment as the world is becoming and becoming more smaller and people don't want to dress more differently from what is worn outside so there is a convergence as we go along (STH 01).

.....western culture in a way has also affected this shift as the things that happen outside are reflected in what we do here as people tend to copy the western styles which are seen in our traditional dress now. You know in the past we did not have a lot of media houses and fashion shows but now they have become very common (MANU 012).

The styles have just evolved and the loose ones have given way to the fitted ones and I also think people have become more conscious of their figures and want to show more of it. In a way technology has also contributed to this change as previously we could not access the type of machines we have now and you can get whatever you want just that they are expensive (MANU 08)

The above statements are a clear indication of the dynamism of culture and its link to the accessibility of the global world.

Most of the participants revealed that the slit and kaba has become more fitted and thereby reveal the contours of the body which could be due to the fact that Ghanaian women are now more conscious about their figures. As a result the slit and kaba which used to be semi-fitted to loose and tend to conceal most of the body parts has changed in fit as observed from these excerpts:-

.....the slit for instance is no more straight but very shaped to conform to the body and even the kaba has wider varieties with fitted and wider necklines, now with smaller sleeves, strapped or strapless tops. The kaba now almost clings to the body unlike the past when we had the loose type of kaba now out of fashion and reserved for the elderly (MANU 02)

You know we Africans have a type of shape, the curves in us and if you wear fitted slit and kaba it gives out the shape you have. That is why the slit has been modified from the olden days where it is just wrapped around the body which makes you look straight but now it gives out the shape around the hips (MANU 04)

It could be that it gives out the shape so we go back to the issue of figure shape again. Unlike previously people did not like being covered all over the body and because the slit is shaped most women now like it and due to the modification everybody likes it now. Previously it was left for the older women and now the younger women are even wearing it more than the older women and for the slit you can put the opening where you like it, you see it is very stylish now whereas it was only one way in the olden days (MANU 06)

From the above excerpts, it looks as if the figure of the Ghanaian woman has a cultural significant and tend to influence the part of the body that is revealed. It is well

documented that in Ghana a full torso for a woman is the culturally ideal figure type hence admired by men as portrayed in this statements "men admire it very much" (MANU 02) and "It could be that it gives out the shape so we go back to the issue of figure again" (MANU 06).

The results also suggest that the design of the slit and kaba have become more simplified as compared to a decade ago and has led to increase usage. The results further suggest that there is an increase usage for other non-traditional functions and by the youth which was not previously the case. The participants attributed this to western designs and the availability of different fabrics that are more colourful and attractive. Influence of western dress has also been linked to increase in usage as there is now a blend of western and local designs which looks more like western dress which is worn for everyday use. It is worth noting that western dress is used as everyday wear for most average Ghanaians therefore western influence could affect the usage as the traditional dress has taken more western features as explained in the following:

> I think the younger ones are accepting the slit and kaba now because of the change in the design as we now design it to look like what they will wear if they were wearing European clothes but have an African aspect of it which is also cultural (MANU 012)

> ..... They have changed from classic to more daring styles as any style at all can be made from the traditional cloth as halter necks and so on and are more fashionable and the slit as well. Because younger people are wearing it now and the elder ones have also changed a little so there is an increase in usage as you can custom make your dress.....(STH05)

In relation to the change in form and fit of the slit and kaba, the participants are of the view that the current change in the form and fit requires advanced skills in order to produce well fitted garments that mould properly over the body. This supports the findings that the slit and kaba has evolved in terms of fit and the requirement for its production therefore necessitates advanced techniques of production methods as seen from the following excerpts:

> .....almost all the designs are fitted so you need proper skills to mould the garment. The loose kaba did not require much skill. With the fitted kaba you need to consider the figure of the client, try to enhance the good and minimize the bad (MANU 08).

6.3.5 Summary of findings from the Evolution of Slit and Kaba

The findings indicated that the slit and kaba has evolved in terms of garment designs and fabrics which are the result of factors such as the media and western fashion. The design of the traditional dress has become more fitted and reveals the contours of the

figure and may be linked to the cultural significance of women's bodies within the Ghanaian culture. Well rounded and full hips are considered as the ideal figure which is emphasised by fitted clothes at the hip area. The findings further revealed that the change in form and fit has simplified the traditional dress as it has taken more western features. This has led to the increase in usage for other non-traditional functions and the youth now find it more attractive to use. The above findings are similar to those already found under the observation (Section 6.2.3.2) and confirmed that the traditional dress has evolved into its current state.

It is clear from the findings that the current change in form and fit requires advanced construction techniques in order for the garment to fit the contours of the body properly. There is therefore the need to adopt advanced production techniques which is linked to the second objective of the current study.

6.4 Manufacture of Traditional Dress (Manufacturers)

In this section the findings on the manufacture of the traditional dress is presented which include the gathering and utilisation of anthropometric data. All the manufacturers interviewed in this study take body measurements of their customers for the production of the slit and kaba as a custom made garment. The manufacturers explained that because a good body measurement and consistency is vital in the production of fitted clothes, they prefer to take these measurements themselves. This explains the importance these manufacturers attach to obtaining anthropometric data which is the foundation of well fitting garments and underlines the need for good and reliable data.

In relation to how these measurements are obtained, the findings revealed that the manual or traditional method of obtaining anthropometric data through the use of the tape measure is employed. These measurements are normally taken over the customers' garments in exception with bulky garments which may affect the reliability of such measurements. The findings further indicate that the same number of measurements is taken for all dress types which include traditional and western designs.

In terms of the utilisation of the anthropometric data, the findings revealed that eight out of the twelve manufacturers obtain patterns for their garments mainly through the use of

the free hand technique only which they consider as more appropriate, faster and simpler in relation to the flat pattern technique which is said to be more time consuming. However, four manufacturers on the other hand agree to use flat patterns for more complicated styles which they consider as more accurate as it enhances the fit of the garment "We use mainly freehand cutting but we use flat patterns for complicated styles" (MANU 08). These explanations and preferences can be observed from the following statements by three of the manufacturers:

> For me freehand cutting is faster so I normally use that but because I have been trained in flat pattern making so it is easier to draft directly onto the fabric (MANU 012).

> We normally use flat patterns as some of the styles are a bit complicated and sometimes I use commercial patterns and this enhances the fit of our garments although it is time consuming (MANU 02).

> I use both the flat pattern cutting and the freehand but I prefer the flat pattern as it gives you the exact size as it is more accurate. It also enhances the fit of the slit and kaba as certain dart positions can be manipulated although the flat pattern drafting is very time consuming (MANU 04).

From the above excerpts it is evident that there is a high preference for the freehand cutting technique over flat pattern making which may affect the fit and quality of the slit and kaba. This however could be a result of the type of training received by most of these manufacturers through the apprenticeship which limits the use of their cutting out techniques. The findings suggest that four of the manufacturers are however concerned about the skills of some manufacturers obtained through the informal apprenticeship system which may affect the utilisation of the anthropometric data.

The very few manufacturers who use both freehand cutting and flat pattern making may have acquired these skills through formal training. These findings could be bedrock in the restructure of the informal apprenticeship system of training of the garment sector in Ghana. As the slit and kaba has taken more western features, there is the need to re-examine the type of training given to the manufacturers so as to better equip them with the necessary skills needed to face the challenges of globalisation.

6.4.1 Development of a Sizing System (Manufacturers)

In terms of development of sizing systems the data suggest that there is no sizing system currently used in Ghana therefore manufacturers use size charts of other countries for

instance British and American sizing systems. This underlines the fact that garment production in Ghana is mainly custom made as revealed in section 6.2.5.

However, most of the manufacturers expressed the view that there is the need for a sizing system to be developed for the Ghanaian woman in order to promote the garment industry. In addition the manufacturers are of the view that, for large volume mass production to be adopted in Ghana requires a sizing system to capture the body shape of the African woman. Some of the manufacturers are also of the view that a development of a sizing system in Ghana could be bedrock for the garment industry in the West African sub-region as our body shapes are basically the same. Other manufacturers link the development of a sizing system to growth of the garment industry in Ghana as explained in the following statements:

> You see over here the industry is not developed so it will be useful for large companies who want to produce garments for wholesale it will facilitate their work but not for individual manufacturers (MANU 08)

> ..... there is no sizing system for Ghanaian women so I think there is a need to have a size chart as our fashion has come of age so it is high time we size ourselves and this will promote the garment industry a lot. I use the British and American sizing systems..... (MANU 016)

The results further reveal that there are no standards in terms of garment production in Ghana therefore the manufacturers use individual standards for their products as there are no garment standards currently available in the country.

One manufacturer is however of the view that there should be a licensing in the garment industry in order to regulate the quality of garments that are produced. This she said will also affect the type of training the manufacturers obtain through the informal apprenticeship currently been used in the country. The results also revealed that although most of the manufacturers are aware of at least one international size chart, it is only used to produce garments for clients who are outside the country. This is because almost all their customers rely on custom made garments which do not require the use of sizing systems. However, the few manufacturers who utilise sizing systems expressed the frustrations experienced with the different size charts in terms of coding and variations in the body measurements such as "I do not use international sizes as I mainly do free hand cutting and even if I have to use it I will need to adjust it to suit our figure type" (MANU 02).

6.4.2 Mass Customisation of Traditional Dress (Manufacturers)

In terms of the adoption of mass production for the slit and kaba to make it a ready-to-wear garment, most of the manufacturers were of the view that it could be done but as the slit and kaba is a traditional dress; it could lose its value and meaning. They however suggest the adoption of mass production for western garments so that the slit and kaba remains a custom made garment in order to preserve its cultural value and uniqueness which is a vital characteristic of the slit and kaba.

From the excerpt below the manufacturers are of the view that the adoption of mass production requires the development of a sizing system which is currently not available therefore this could hinder the implementation of that strategy.

> I think there is the need but looking at the fact that we don't have a size chart it will be difficult so unless a size chart is developed first it will be impossible but may be mass customisation will be possible now (MANU 08).

It is also evident from the findings that most of the manufacturers are if favour of the adoption of mass customisation rather than mass production as explained in the statement below

> .....I think mass customisation is possible but not mass production due to individuality and different tastes. You know people do not want to wear what others are wearing so mass customisation will work better for that individual taste (MANU 020).

The above statement further reiterates the preference of mass customisation against mass production which could be a result of the fact that the slit and kaba is already produced as a custom made garment and therefore should follow a natural progression of mass customisation for its development.

6.4.3 Summary of findings from Manufacturers of Traditional Dress

The findings from the interviews with the manufacturers of the traditional dress revealed that the body measurements of the consumers are taken for custom made garments. The measurements are mainly taken by the owner managers due to the importance attached to obtaining anthropometric data in order to achieve good fit. These measurements are obtained through the traditional method using the tape measure and the same number of measurements is taken for both traditional and western dresses.

In terms of utilisation of the anthropometric data, the findings suggest that the free hand cutting technique is highly preferred over the flat pattern drafting. And although the free hand cutting method has its shortfalls, the manufacturers consider it to be simpler, faster and more convenient. However minority of the manufacturers were found to employ the flat pattern making for more difficult and complicated designs. The manufacturers who employ flat pattern making technique confirmed that this method of utilising anthropometric data is more accurate, reliable and enhances the fit of the garments produced. The preference for free hand is in line with those found in the observation (See Section 6.2.5) and may be linked to the type of training obtained through the apprenticeship system of education in Ghana. These findings could be a foundation for the restructure of the garment sector in general.

The findings revealed that Ghana currently has no sizing system for the population as a result the manufacturers use sizing systems of other countries which may not cater for the differences in body shapes specific to each country. It appears that the lack of sizing system may be because there has never been a requirement for the slit and kaba to be a ready-to-wear dress but, as it takes more western features, the fit of the garment has become more important. It could also be due to the custom made process which is mainly utilised. This underlines the general consensus by the manufacturers that there is an urgent need to develop a sizing system for Ghana in order to capture the unique body form of the African woman. There is also link of the development of a sizing system to the growth of the garment sector as expressed by most of the manufacturers.
It is also evident from the findings that there are no standards in terms garment production which may affect the standardisation and quality of garments produced.

It is evident from the findings that in terms of adopting new strategy for the production of the traditional dress, there is a preference for mass customisation over mass production. Mass customisation is the large scale production of individual products and is considered as an advancement of the custom made process which is currently used for the production of the traditional dress. Therefore the adoption of mass customisation is considered as a better option to cater for the individual aspect of the traditional dress which is considered as attractive.

6.5 Development of a Sizing System (Stake Holders)

In this section the findings of the stake holders on the development of a sizing system for Ghanaian women are presented. Standards are a guide to check the quality and safety of products before the items reach the target consumer. The results however suggest that there are no standards that are currently used in Ghana in terms of garment production for women's wear. On the issue of quality standards, STH 03 explained:

> .....there are no standards so we are all doing our own thing. It is only those who produce for export that use some standards for the countries they produce for but if it is to a country without standards then we send anything to them and they accept it. So it is the market that has determined the standards for Ghana that we follow.

The above statement may however suggest that the markets whether local or international determine the standards that are used so where there are no standards the quality of garments could be compromised. Another stakeholder said:

> .....that must give way to standardisation and of course there are many advantages of standardisation and I believe that people will be willing to sacrifice the individual's expressions for a well made, well tailored, well designed garment which they will find with convenience in the boutiques (STH 01)

> Until we develop the standards and all the groundwork we cannot move on for our garments to be taken off the rack as it is so seeded in tradition and culture (STH 03).

In relation to the development of a sizing system for Ghanaian women the stake holders expressed similar views on the need to categorise the body form as the figure is different from that of the western body form. A stake holder stated 'Definitely, that's the only way you can get the Ghanaian form as this will standardise it and the earlier the better' (STH 05). This statement implied that the body proportions of the Ghanaian women may be different from that of other countries which necessitates the collection of anthropometric data for garment production in order to achieve good fit. The development of a sizing system will promote the garment sector and have a positive influence on the production process as explained in this statement "I think this will promote the garment industry except that it will entail a lot of work trying to standardise it" (STH 05).

In relation to the mass production of the slit and kaba a stake holder indicated "because at the moment one of the main attraction for slit and kaba is the ability to express the individuals own preference" (STH 03) it will be difficult to adopt that strategy which does not cater for individual preferences.

Contrary to that view, another stake holder suggested that the future trend of the Ghanaian industry will be towards mass production as more people embrace western garments and as a result there is an urgent need to develop a size chart specifically for Ghanaian women:

> ..... because principally I think the future of clothing in Ghana is going to tilt towards ready-to-wear garments. I think the idea of developing a good ready-to-wear industry in this country will depend on how we are able to standardise the garment sizing for our people but at the moment it is not standardise so it is difficult for any garment manufacturer to sit back and think of something with the right sizing that will appeal to greater number of our people so at the moment it is a challenge to do the sizing properly for the average Ghanaian can try on and be comfortable with (STH 01).

These views further strengthens the fact that there are two systems of dress used in Ghana and western dress has influenced the evolution of the slit and kaba which has taken more western features.

In terms of mass customisation of the traditional dress, the stake holders are of the view that there is the need to adopt that strategy for the production of the traditional dress as that will not be a complete shift compared to custom made which is the system being practised currently. This they explain will continue to cater for individual tastes and preferences unique to the slit and kaba. However, the stake holders suggest that the adoption of mass customisation requires the manufacturers to acquire enabling technologies and education is needed for the consumers in order to create awareness. "You see this can be achieved only if we can change the mind set of Ghanaians as it comes with a paradigm shift". The findings further suggest that the participants are aware of the fact that mass customisation depends on the standardisation of the production process which are currently not available in Ghana. These views are described in the following excerpts:

> .....that will be a less drastic move from what we have to the prêt-aporte or ready-to-wear because in that case it is still possible to consider some peculiar nature of some people and they will still get something pretty fast and well made as well so it should be the natural progression from where we are than a full blown mass production (STH 03).

From the findings it is evident that there is the need to mass customise the traditional dress and this requires the adoption of enabling technologies and the development of a sizing system to categorise the body form of Ghanaian women.

The findings however indicated that the stake holders are not in favour of the production of the slit and kaba for export. This is because this dress is considered as a national dress for Ghanaian women and signifies the cultural values of the country.

"How do we export a dress that reflects our culture and identity? No, it can not be done; it is for our consumption only" (STH 05). This is a strong suggestion that the use of the slit and kaba is cultural which signifies national identity that needs preservation and therefore cannot be shared with others.

6.5.1 Promotion of the Garment Sector (Stake Holders)

The findings on the promotion of the garment sector in Ghana are presented in the current section which is from the views of the stakeholders interviewed in this study. From the findings, it is evident that the stake holders believe that the skills of most manufacturers that are acquired though informal apprenticeship are not up to the level needed. As a result this affects their workmanship. A stake holder said:

> .....most of the manufacturers we have were trained by people who did not go through formal education and it sort of limits their creativity and I think we need to take the industry to a higher notch getting more people with creativity coming to train the manufacturers and at the moment we are not happy and I think purpose of our waxstyle event is to help bring it up by raising the level of creativity by people who have had a higher level of education so that can raise the level of the industry better than what the uneducated can do (STH 01).

Another stake holder suggested that the polytechnics syllabuses are outdated and do not reflect the current needs of the industry although formal training should be able to solve the skill problems of the industry. In terms of the evolution of the form and fit of the slit and kaba the stake holders expressed the view that there is the need for acquiring advanced skills in order to meet that challenge as seen from this statement. In relation to the training acquired through apprenticeship, the stake holders expressed their concern and suggested that this is not high enough to adapt to the current trends in the garment industry both on the local and international scenes as explained in the following statements:

> Definitely as we are moving from traditional skills to technical know-how as fashion is so dynamic and we experience that here in Ghana too even with the slit and kaba the designs keep changing as with the bustier and the boning as well (STH 03)

> You see, it is wrong notions Ghanaians have that only those who are not good academically should learn skills and this is affecting us in all aspects including garment production (STH05).

Contrary to the above view point, the stake holders however confirmed an improvement in the skills in the garment sector as a result of graduates from the national polytechnics who are now entering into the production of garments.

> I think a lot of educated people have now come into the trade and that has also made a lot of improvement to the Ghanaian market as they have applied their skills to the industry (STH 05).

The above statement suggests a shift in the skills and performance of the garment sector and may imply that education is an important component in the development of skills for the industry. Although informal training has been recognised as a method of learning, it depends on the manner in which the training is done and by whom.

In regards to the provision of technical assistance for the manufacturers, a stake holder from the Association of Ghana Industries (garment and textiles) explained that training workshops are often organised to upgrade the skills especially in the management of their enterprises:

> We do not promote the marketing of goods for manufacturers but what we do is basically advocating so we do that by organising training workshops for their members and the leaders who form the AGI council will go around to their members to find out what their needs are and put this together in a paper and present it to the Private Enterprise Development or the Government so they lobby government to solve these problems (STH 03).

This is a clear indication of the over reliance on the government to solve issues affecting the private sector in Ghana which does not encourage the SMES to device ways of standing on their own. On the other hand the marketing director of the GTP, also a stake holder interviewed explained that:

> We have not yet made a firm policy on our involvement in the garment industry but I believe that it will not be too long before we went into such ventures to be seen as offering direct assistance to the industry out there to improve it (STH 01).

6.6 Findings from Questionnaire

In this chapter, the results of the questionnaire and focus group interviews from consumers of the traditional dress are presented. The SPSS (version 12) was utilised to analyse the data generated from the questionnaire through descriptive statistics, analyses of variance (ANOVA) with a significant level at ($p \leq 0.05$) to determine the effect of the respondents demographics; age, education and income on the dependent variables except marital status which was analysed using t-test. Critical analyses were made to determine the effect of the demographic factors on the meaning, evolution, utilisation and the acceptance of mass customisation.

6.7 Demographic Characteristics of the Respondents

A total of 474 Ghanaian women between the ages of 20-54 years completed and returned usable questionnaires for a response rate of 94.8 percent. The sample was based on the age group distribution of the 2000 Ghanaian population survey (refer to Chapter Four, Table 4.1). The results in Table 6.6 consisted of the demographic characteristics of the respondents which include age group distribution, education, income and marital status.

Table 6.6: Frequency Distribution and Percentage of Respondents' Demographic Characteristics

Variables	Frequency of Sampled Population	Frequency of Actual Respondents	Percent (%)
Age groups			
20-24	115	108	23.2
25-29	106	100	21.5
30-34	83	78	16.8
35-39	69	61	13.1
40-44	54	50	10.8
45-49	41	38	8.2
50-54	32	30	6.5
Total	**500**	**465**	**100.00**
Nil Response		9	
Education			
Secondary		50	11.7
Technical		5	1.2
Vocational		21	4.9
Polytechnic		159	37.1
University		194	45.2
Total		**429**	100.0
Nil Response		19	
Not Applicable		26	
Monthly Income in Ghanaian cedi (GH¢)*			
< 40		21	4.5
40 - 70		92	19.9
71 – 100		55	11.9
101 – 140		34	7.3
141 – 170		97	19.4
171 – 200		64	13.8
>201		100	23.1
Total		**463**	100
Nil Response		11	
Marital Status			
Single		213	45.6
Married		254	54.4
Total		**467**	100
Nil Response		7	

*1GH¢ = 0.96 US$ (as at January 2008)

The results in Table 6.6 suggest that all the age groups were well represented based on the total sampled population. 45.2% of the respondents in this study held a university degree, 37.1% held a polytechnic qualification and the rest having some form of education. This could be as a result of the fact that all the respondents in this study were sampled from the government ministries and the polytechnics therefore all the respondents in this study are educated. (Refer to chapter five for sampling). Examining income, (23.1%) of the respondents earn a monthly income above ¢201 Ghanaian cedi

with the minority (4.5%) of the respondents earning less than 40 Ghanaian cedi per month. Just over half of the respondents were married (54.4%) and less than half (45.6%) single

6.8 Meaning of Traditional Dress

The meanings individuals assign to an item of clothing affect their choices and how these items are used. Early researchers have pointed out the relationship between ethnicity and the usage of ethnic items such as dress (Crane et al., 2004; Eicher and Sumburg, 1995). Descriptive statistics have been used in past researches (Rajagopalan and Heitmeyer, 2005; Forney and Rabolt, 1985-86; Matthews, 1979) to measure attitudes and therefore this approach was adopted to fulfil the first objective of the study. The SPSS software (version 12) was utilised to analyse the results of the questionnaire.

6.8.1 Descriptive Statistics of Meaning of Traditional Dress

In order to determine whether the respondents agreed or disagreed with the statements on the meaning of traditional dress, it was necessary to first compute the mean averages, percentages and the standard deviations which are presented in Table 6.7 (Refer to appendix 5 for the questionnaire). From the findings, the meanings that the respondents attach to the slit and kaba are diverse and include cultural and national identities, sense of belonging to the Ghanaian culture and admiration. The results suggest that statement on cultural heritage scored the highest percentage of 93.4 and religious values scored the lowest percentage 18.5.

Table 6.7: Percentage, Mean and Standard Deviation on Meaning of Traditional Dress

Statements	Percentage Agreed	Mean Score	Standard Deviation
Cultural Heritage	93.4	4.36	.675
Admiration	89.2	4.33	.775
Ghanaian Identity	82.1	4.15	.985
Sense of Belonging	66.3	3.63	1.059
Respect	62.6	3.58	1.188
Reflection of Age	42.1	2.96	1.338
Status in Society	33.1	2.73	1.213
Financial Status	32.7	2.67	1.374
Moral Values	28.1	2.83	1.912
Expression of Mood	26.5	2.46	1.225
Religious Values	18.5	2.50	1.129

(a) The higher the mean, the higher the level of Agreement

6.8.2 The Relationship between Demographic Factors and Meaning of Traditional Dress

In order to analyse the demographic groups' differences on the meaning of traditional dress, a series of Analyses of Variance (ANOVA) were conducted using the respondent's demographic variables such as age, education and income as the independent variables and the statements on the meanings of traditional dress as the dependent variables.

6.8.3 Age and Meaning of Slit and Kaba

One way ANOVA with a significant level at ($p \leq 0.05$) was used to determine the effect of age on the meaning of the traditional dress as shown in Table 6.8. The results found age of the respondents significantly influence certain variables on the meaning of traditional dress. Among these variables, Ghanaian identity ($F = 7.546$, $p < .001$), religious values ($F = 5.325$, $p < 0.001$), reflection of age ($F = 2.666$, $p < 0.05$), sense of belonging ($F = 3.313$, $p < 0.01$) and financial status ($F = 3.838$, $p \leq 0.001$) were found to be significant.

A post hoc Multiple Comparison Scheffe test (Bryman and Cramer, 2005) was used to find differences between the means of the age groups as the data has unequal numbers of respondents in the groups. These results indicated that in terms of Ghanaian identity, age group 20-24 is significantly different from the groups 25-29 ($p \leq 0.001$), 30-34 ($p < 0.01$), 40-44 ($p < 0.001$), 45-49 ($p < 0.05$) and 50-54 ($p < 0.05$). In terms of religious values, age group 20-24 is significantly different from the groups 30-34 ($p < 0.01$) and 50-54 ($p < 0.05$). Similarly, it was found that in terms of financial status, age group 20-24 is significantly different from 40-44 ($p < 0.05$) and the age group 40-44 is

significantly different from groups 35-39 ($p < 0.05$) and 45-49 ($p < 0.05$). There was however no significant differences among the age groups for the other variables on the meaning of traditional dress. The findings revealed that the younger respondents associated the meaning of slit and kaba more with cultural heritage and religious values and less with financial status. On the other hand, the older respondents associated meaning more with financial status, respect and reflection of age.

Table 6.8: ANOVA for the Relationship between Age and Meaning of Traditional Dress

Variables	Mean Score and Standard Deviations of Age Groups							F-value	P
	20-24	25-29	30-34	35-39	40-44	45-49	50-54		
Ghanaian Identity	3.63 (1.308)	4.28 (0.780)	4.24 (0.809)	4.16 (0.840)	4.52 (0.789)	4.32 (0.873)	4.37 (0.809)	7.546	0.001***
Cultural heritage	4.36 (0.690)	4.42 (0.781)	4.37 (0.626)	4.18 (0.500)	4.56 (0.611)	4.24 (0.714)	4.30 (0.7020)	1.844	0.089
Religious values	2.92 (1.254)	2.59 (1.198)	2.19 (0.941)	2.39 (0.936)	2.28 (0.834)	2.37 (1.149)	2.00 (1.050)	5.325	0.001***
Moral values	3.17 (1.136)	2.69 (1.293)	2.51 (0.977)	2.66 (1.167)	2.42 (0.758)	3.74 (1.210)	2.73 (1.285)	2.955	0.008
Status in society	2.67 (1.184)	2.84 (1.331)	2.71 (1.118)	2.44 (1.148)	2.74 (1.026)	2.76 (1.304)	3.00 (1.390)	1.012	0.417
Respect	3.43 (1.255)	3.43 (1.183)	3.47 (1.266)	3.92 (0.971)	3.70 (1.216)	3.63 (1.149)	3.73 (1.112)	1.699	0.127
Reflection of age	2.72 (1.400)	2.88 (1.229)	2.99 (1.233)	3.25 (1.374)	3.46 (1.328)	2.66 (1.381)	3.10 (1.494)	2.666	0.015*
Belonging	3.28 (1.183)	3.04 (1.214)	3.50 (0.987)	2.82 (1.088)	3.24 (1.021)	2.76 (1.283)	3.23 (0.971)	3.313	0.003**
Financial status	2.04 (1.260)	2.18 (1.274)	2.14 (1.003)	1.92 (1.069)	2.82 (1.137)	1.89 (1.008)	2.37 (1.159)	3.838	0.001***
Expression of Mood	2.50 (1.279)	2.50 (1.227)	2.62 (1.271)	2.28 (1.097)	2.42 (1.326)	2.50 (1.247)	2.10 (1.029)	0.905	0.491
Admiration	4.13 (0.918)	4.44 (0.770)	4.35 (0.718)	4.16 (0.875)	4.52 (0.580)	4.45 (0.555)	4.53 (0.571)	3.070	0.006

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

6.8.4 Education and Meaning of Slit and Kaba

The ANOVA results suggest that education of the respondents significantly influence certain variables in relation to the meaning of traditional dress by as shown in Table 6.9. Among the variables, identity was significant at ($F = 2.504$, $p < 0.05$), religious values ($F = 5.465$, $p < 0.001$), moral values ($F = 6.057$, $p < 0.001$), status in society ($F = 4.253$, $p < 0.01$), belonging ($F = 7.351$, $p < 0.001$) and financial status ($F = 3.870$, $p < 0.01$), mood ($F = 3.870$, $p < 0.01$) and admiration ($F = 5.910$, $p < 0.001$) were found to be significant.

A post hoc Scheffe test indicated that in terms of religious values, the group polytechnic was significantly different from the group university ($p < 0.001$). Similarly, in terms of moral values, the group polytechnic was significantly different from the university ($p < 0.05$) and secondary ($p < 0.01$). However, in terms of status in society, the group secondary was significantly different from the university ($p < 0.05$). There were no significant differences among the educational groups on the other variables on the meaning of traditional dress. The results indicated that the more educated respondents associated the meaning of dress more with sense of belonging, financial status and status in society whereas the less educated respondents associate meaning more with cultural heritage, Ghanaian identity and reflection of age.

Table 6.9: ANOVA for the Influence of Education on the Meaning of Traditional Dress

Variables	Mean Score and Standard Deviations of Educational Groups					F-value	P
	Sec	Tech	Voc	Poly	Univ.		
Ghanaian Identity	4.28 (0.927)	4.60 (0.548)	3.71 (0.902)	4.02 (1.161)	4.24 (0.885)	2.504	0.042*
Cultural Heritage	4.50 (0.505)	4.40 (0.548)	4.10 (0.539)	4.33 (0.775)	4.35 (0.667)	1.364	0.246
Religious Values	2.42 (1.279)	2.60 (0.548)	2.43 (1.248)	2.82 (1.256)	2.27 (0.923)	5.465	0.001***
Moral values	2.30 (1.199)	2.60 (0.548)	2.24 (1.044)	2.99 (1.150)	2.57 (1.042)	6.057	0.001***
Status in society	2.26 (1.209)	2.60 (0.548)	2.14 (1.108)	2.69 (1.143)	2.90 (1.145)	4.253	0.002**
Respect	368 (1.362)	2.00 (0.000)	3.62 (0.740)	3.58 (1.255)	3.61 (1.156)	2.297	0.058
Reflection of Age	3.40 (1.140)	3.80 (1.1643)	2.81 (1.463)	2.92 (1.359)	2.96 (1.258)	1.873	0.114
Belonging	2.48 (1.182)	2.40 (0.548)	2.90 (1.179)	3.26 (1.172)	3.36 (1.044)	7.351	0.001***
Financial status	1.68 (0.957)	2.00 (.000)	2.33 (1.238)	2.11 (1.307)	2.38 (1.109)	3.870	0.004**
Expression of Mood	1.94 (1.185)	2.00 (0.000)	2.43 (1.248)	2.70 (1.282)	2.54 (1.209)	3.870	0.004**
Admiration	4.68 (0.683)	4.60 (0.548)	3.81 (0.750)	4.21 (0.894)	4.35 (0.706)	5.910	0.001***

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$
The higher the mean, the higher the level of usage
(a) (Standard Deviations)

6.8.5 Income and Meaning of Slit and Kaba

The results in Table 6.10 suggest that income of the respondents significantly influence certain variables in relation to the meaning of traditional dress. The variables include Ghanaian identity significant at ($F = 3.508$, $p < 0.01$), religious values ($F = 5.338$, $p < 0.001$), respect ($F = 2.556$, $p < 0.05$), sense of belonging ($F = 6.276$, $p < 0.001$) and financial status ($F = 7.351$, $p \leq 0.001$).

The post hoc test revealed that in terms of Ghanaian identity, the income group ¢40.00-¢70 is significantly different from the group >¢201.00 at ($p < 0.01$). Similarly, in terms of religious values the group <¢40.00 is significantly different from ¢171.00 - ¢200.00 and >201.00 at ($p < 0.05$) and the group ¢40.00 - ¢70.00 from ¢171.00 - ¢200.00 and >¢201.00 at ($p < 0.05$). In terms of sense of belonging, the group <¢40.00 is different from the group ¢71.00 - ¢100.00 at ($p < 0.05$), ¢40.00 with ¢71.00 - ¢100.00 at ($p < 0.001$) and ¢71.00 - ¢100.00 is different with >¢201.00 at ($p \leq 0.001$). Finally, in relation to financial status, the group ¢40.00 - ¢70.00 is significantly different from

¢71.00 - ¢100.00 at ($p < 0.05$), ¢71.00 - ¢100.00 is different with ¢141.00 - ¢170.00 and ¢171.00 - ¢200.00 at ($p < 0.05$).

The findings indicated that the higher income group associate meaning of slit and kaba with Ghanaian identity, financial status and respect whereas the lower income group associate meaning more with religious values and sense of belonging.

6.10: ANOVA for the Influence of Income on the Meaning of Traditional Dress

	Mean Score and Standard Deviations of Income Groups							F-value	P
Variables	<¢40.00	¢40.00-70.00	¢71.00-100.00	¢101.00-140.00	¢141.00-170.00	¢171.00-200.00	>¢201.00		
Ghanaian Identity	4.24 (0.768)	3.80 (1.286)	4.07 (1.052)	4.35 (0.884)	4.17 (0.868)	4.17 (0.901)	4.40 (0.763)	3.508	0.002**
Cultural Heritage	4.29 (0.463)	4.24 (0.898)	4.36 (0.677)	4.65 (0.485)	4.33 (0.561)	4.30 (0.634)	4.45 (0.648)	1.987	0.066
Religious Values	3.29 (1.189)	2.85 (1.292)	2.42 (1.066)	2.53 (1.051)	2.50 (1.041)	2.19 (0.871)	2.22 (1.110)	5.338	0.001***
Moral values	3.10 (1.300)	2.83 (1.228)	2.82 (1.335)	2.53 (0.929)	2.82 (1.001)	2.42 (1.005)	2.59 (1.181)	1.798	0.098
Status in society	2.76 (0.995)	2.80 (1.197)	2.51 (1.230)	2.50 (0.992)	2.70 (1.213)	2.97 (1.098)	2.75 (1.401)	0.980	0.438
Respect	3.62 (1.024)	3.43 (1.337)	3.42 (1.228)	3.03 (1.114)	3.67 (1.180)	3.80 (0.995)	3.78 (1.176)	2.556	0.019*
Reflection of Age	3.29 (1.521)	2.80 (1.353)	2.62 (1.340)	3.24 (1.257)	2.87 (1.182)	3.19 (1.446)	3.15 (1343)	1.996	0.065
Belonging	3.52 (1.250)	3.41 (1.081)	2.45 (1.199)	2.91 (1.190)	3.00 (1.039)	3.33 (1.169)	3.34 (1.017)	6.276	0.001***
Financial status	2.76 (1.841)	2.72 (1.417)	1.89 (1.149)	2.50 (1.161)	2.81 (1.357)	2.89 (1.311)	2.85 (1.372)	3.910	0.001***
Expression of Mood	2.57 (1.207)	2.85 (1.3580	2.13 (1.218)	2.06 (1.254)	2.44 (1.282)	2.45 (0.872)	2.47 (1.208)	2.875	0.009
Admiration	4.43 (0.676)	4.22 (0.981)	4.35 (0.615)	4.29 (0.719)	4.38 (0.716)	4.59 (0.495)	4.25 (0.849)	1.901	0.079

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

The higher the mean, the higher the level of usage

(a) (Standard Deviations)

6.8.6 Marital Status and Meaning of Slit and Kaba

In relation to marital status and meaning of the traditional dress, a t-test was used to compare the means of the respondents (Bryman and Cramer, 2005: Kinnear and Gray, 2004) as presented in Table 6.11. Levene's test indicated significant difference ($p<0.05$) for dependent variables such as identity, religious and moral values, respect, financial status and admiration. A t-value revealed that there are significant differences

among the means of the respondents, (2-tailed) at ($p < 0.05$) in variables such as Ghanaian identity, religious and moral values, respect and age.

It was evident from the findings that unmarried respondents (single) associated the meaning of dress more with cultural heritage, religious and moral values whilst the married respondents more with Ghanaian identity, reflection of age and respect.

Table 6.11: Influence of Marital Status on the Meaning of Traditional Dress

Variables	Mean Scores		T-value	Levene's Test
	Single	Married		
Ghanaian Identity	4.00	4.28	-2.929**	0.001
Cultural heritage	4.38	4.34	.674*	0.372
Religious values	2.77	2.29	4.588**	0.001
Moral values	2.84	2.63	2.002**	0.036
Status in society	2.75	2.73	.160*	0.065
Respect	3.34	3.78	-4.033**	0.001
Reflection of age	2.84	3.09	-2.020**	0.684
Belonging	3.19	3.14	.467*	0.332
Financial status	2.14	2.21	-.658*	0.004
Expression of Mood	2.49	2.46	.208*	0.402
Admiration	4.29	4.36	-.967*	0.002

* Significance above 0.05

**Significance below0.05

To conclude, it is evident from the findings that age; education and marital status of the respondents have significant effect on the meaning of slit and kaba and may determine the level of importance attached to this dress by each respondent.

6.9 The Development of Slit and Kaba

Dress as a material culture is dynamic and may change over a period of time due to certain external factors. The slit and kaba, a Ghanaian traditional dress may have evolved over the years into its current state.

6.9.1 Descriptive Statistics for Fabric and Style

The respondents were asked to rank the popularity of the fabrics used for the slit and kaba and the source of these styles. The results for the popularity of fabrics and choice of styles are presented in Table 6.12 and indicated that traditional wax print is the most popular fabric used for the slit and kaba (74.9%) with lace (46.4%) and kente (44.5%). Designs of the slit and kaba however, are mostly selected from traditional style catalogues (60.9%) and newspapers and magazines (46.0%).

The findings are in line with the view that slit and kaba is a traditional dress made in traditional fabrics and designs and with expensive ceremonial hand woven kente beyond the reach of many, wax prints have become the most accessible cloth for most average Ghanaians for most social events. In terms of garment design of the slit and kaba it is evident that some elements of western fashion have been incorporated into its design although this dress has largely remained a traditional dress.

Table 6.12: Mean and Standard Deviation on Fabric Types and Styles

(a)Fabric Types				(b) Design		
Types of fabric	**Fabrics in Percentages**	**Mean**		**Type of Designs**	**Designs in Percentages**	**Mean**
Wax Prints (Traditional local fabric)	74.9	2.73		Western style Catalogues	14.3	2.17
Lace	46.4	2.38		Traditional style Catalogues	60.9	3.81
Batik, tie and dye (Traditional local fabric)	20.3	1.82		Own Creative Ability	40.5	3.37
Hand woven kente (Traditional local fabric)	44.5	2.27		Dressmakers creative ability	45.8	3.40
Aso-Oke (Traditional Nigerian hand woven fabric)	20.5	1.91		Designs from the sub-region	42.0	3.31
Other African Prints	37.6	2.21		Designs from Newspapers and magazines	46.0	3.46

6.9.2 Descriptive Statistics for Factors of Development of Slit and Kaba

In the current study, respondents were asked to evaluate the evolution of the slit and kaba by ranking the effect of the following factors; western media, sewing technology, the media and skills of dressmakers on the development of the slit and kaba. The results suggest that all the factors have significantly affected the development of the slit and kaba as presented in Table 6.13 with improved sewing technology as the highest percentage (84.2) and economic prosperity the lowest (50.7) percent.

This result implies that the slit and kaba might have undergone some changes from its original form and fit.

Table 6.13: Percentage, Mean and Standard Deviation on Factors of Development

Factors	Influence		
	Percentage	Mean Score	Standard Deviation
Improved sewing technology	84.2	4.11	.979
Improved skills of dressmakers	79.0	4.10	1.057
Media	67.5	3.72	1.241
Improved materials for construction	64.1	3.62	1.231
Western fashion	52.6	3.28	1.421
Economic prosperity	50.7	3.31	1.207

(a) The higher the mean, the higher the level of Agreement

6.9.3 The Difference between Demographics and Choice of Style

In order to analyse the demographic groups' differences on the choice of style for the traditional dress, a series of Analyses of Variance (ANOVA) were conducted using the respondent's demographic variables as the independent variables and the factors on the evolution of the slit and kaba as the dependent variables.

6.9.3.1 Age and Choice of Style

One way ANOVA revealed that age of the respondents significantly influence the choice of style for the traditional dress as shown in Table 6.14. Among the variables western styles ($F = 3.198$, $p < 0.01$), own creative design ($F = 3.888$, $p \leq 0.001$), dressmaker's creative ability ($F = 5.915$, $p < 0.001$), designs from the sub-region ($F = 2.218$, $p < 0.05$) and designs from newspapers, magazines and the television ($F = 2.718$, $p < 0.05$) were found to be significant.

Scheffe post hoc test revealed that there were significant differences among the means of certain age groups. The results indicated that in terms of western styles, the group 20-24 was significantly different from the group 45-49 ($p < 0.05$). Similarly, in terms of dressmakers own designs, the group 20-24 was significantly different from the groups 30-34 ($p < 0.05$), 35-39 ($p < 0.05$), 40-44 ($p < 0.05$) and 45-49 ($p \leq 0.001$). There were no significant differences among the age groups in terms of traditional styles, own designs, designs from the sub-region and styles from newspapers, magazines and the television.

The results suggest that younger respondents' may be more experimental and creative therefore would accept more western features incorporated into the design of the slit and kaba than the older respondents who may prefer more traditional designs.

Table 6.14: ANOVA for the Influence of Age on the Choice of Styles

Variables	Mean Score and Standard Deviations of Age Groups							F-value	P
	20-24	25-29	30-34	35-39	40-44	45-49	50-54		
Western Style Catalogues	2.43 (1.291)	2.29 (1.200)	2.18 (1.181)	2.03 (1.278)	2.24 (1.188)	1.61 (.755)	1.73 (1.258)	3.198	0.004**
Traditional Style Catalogues	3.55 (1.171)	3.77 (1.127)	3.95 (1.056)	3.89 (.896)	3.80 (1.143)	4.05 (.837)	3.97 (1.033)	1.805	0.096
Own Creative Ability	3.47 (1.139)	3.68 (1.136)	3.27 (1.234)	3.15 (.980)	3.00 (1.030)	3.55 (1.267)	2.87 (1.167)	3.888	0.001**
Dressmakers Creative Ability	2.96 (1.032)	3.32 (.815)	3.53 (1.016)	3.57 (.939)	3.58 (.932)	3.82 (.982)	3.40 (.855)	5.915	0.001***
Designs in Vogue in the Sub-region	3.19 (1.098)	3.20 (1.110)	3.24 (1.059)	3.41 (1.283)	3.38 (1.067)	3.37 (1.261)	3.97 (1.033)	2.218	0.040*
Newspapers and Television	3.76 (1.003)	3.58 (1.130)	3.45 (1.124)	3.26 (1.153)	3.20 (1.262)	3.24 (.971)	3.27 (1.081)	2.718	0.013*

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$
The higher the mean, the higher the level of Agreement (0.00-5.00)
(a) (Standard Deviations)

6.9.3.2 Education and Choice of Style

One way ANOVA found education of the respondents significantly influence all the variables on the selection of styles as presented in Table 6.15. Among these variables, western styles ($F = 2.458$, $p < 0.05$), traditional styles ($F = 4.334$, $p < 0.01$), own creative ability ($F = 16.756$, $p < 0.001$), dressmakers creative ability ($F = 7.474$, $p < 0.001$), designs from the sub-region ($F = 3.870$, $p < 0.01$) and designs from newspapers, magazines and the television ($F = 11.811$, $p < 0.001$) were found to be significant.

A post hoc Scheffe test indicated that in terms of traditional styles, the group secondary was significantly different from the polytechnic ($p < 0.05$). Similarly, in terms of own designs, the group secondary was significantly different from the polytechnic ($p < 0.001$) and University ($p < 0.001$). The group vocational was significantly different ($p < 0.05$) from the polytechnic. However, in terms of dressmaker's creative designs, the group secondary was significantly different from the group polytechnic ($p < 0.05$). In terms of selection of designs from newspapers, magazines and the television the group secondary was significantly different from the polytechnic ($p < 0.001$) and University (p

< 0.001) and the vocational was significantly different ($p < 0.05$) from the polytechnic and university ($p \leq 0.05$). There were no significant differences among the educational groups in terms of western styles.

The findings are very significant and suggest that the more educated respondents may be more interested in selecting their own styles and therefore would incorporate western features into their designs than the older respondents who prefer more traditional designs and would rely on the dressmakers to select their styles for them. Education may be one of the key factors in choice of styles for the respondents.

Table 6.15: ANOVA for Education and Choice of Style

Variables	Mean Score and Standard Deviations of Educational Groups					F-value	P
Variables	**Sec**	**Tech**	**Voc**	**Poly**	**Univ.**		
Western Style Catalogues	1.78 (1.075)	1.40 (.548)	2.52 (1.436)	2.25 (1.178)	2.21 (1.252)	2.458	0.045*
Traditional Style Catalogues	4.18 (.941)	3.00 (.000)	3.43 (1.028)	3.64 (1.188)	3.92 (1.040)	4.334	0.002**
Own Creative Ability	2.24 (1.287)	3.00 (.000)	2.71 (1.189)	3.57 (1.100)	3.48 (1.054)	16.756	0.001***
Dressmakers Creative Ability	3.80 (1.107)	4.00 (.000)	3.76 (.768)	3.08 (.925)	3.42 (1.016)	7.474	0.001***
Designs in Vogue in the Sub-region	3.88 (1.256)	3.60 (.548)	3.19 (1.289)	3.21 (1.166)	3.21 (1.096)	3.870	0.004**
Newspapers and Television	2.64 (1.045)	3.60 (.548)	2.81 (.981)	3.70 (1.016)	3.57 (1.124)	11.811	0.001***

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

The higher the mean, the higher the level of Agreement (0.00-5.00)

(a) (Standard Deviations)

6.9.3.3 Income and Choice of Style

The findings in Table 6.16 indicated that the income of the respondents had a significant influence on means in terms of the choice of styles of the slit and kaba. The variables include western style catalogues ($F = 3.125$, $p < 0.01$), own creative ability ($F = 2.607$, $p < 0.05$), dressmakers creative ability ($F = 2.955$, $p < 0.01$) and designs from Newspapers and Television at ($F = 2.894$, $p < 0.01$). The post hoc test however revealed that the group ¢40.00-70.00 was the only group different from >¢201.00 in terms of dressmakers creative ability which indicated that the means were not very significant among three variables.

Table 6.16: ANOVA for the Influence of Income on the Choice of Style

	Mean Score and Standard Deviations of Income Groups							F-value	P
Variables	<¢40.00	¢40.00-70.00	¢71.00-100.00	¢101.00-140.00	¢141.00-170.00	¢171.00-200.00	>¢201.00		
Western Style Catalogues	2.62 (0.740)	2.46 (1.104)	2.11 (1.301)	1.82 (1.445)	2.20 (1.408)	2.34 (1.158	1.88 (1.052)	3.125	0.005**
Traditional Style Catalogues	3.86 (0.964)	3.63 (1.193)	3.84 (1.014)	3.47 (1.187)	3.78 (1.036)	4.02 (0.864)	3.95 (1.119)	1.731	0.112
Own Creative Ability	3.76 (0.995)	3.33 (1.205)	3.62 (1.178)	3.76 (1.017)	3.24 (1.327)	3.41 (0.868)	3.11 (1.135)	2.607	0.017*
Dressmakers Creative Ability	3.43 (1.028)	3.02 (0.926)	3.53 (0.997)	3.35 (0.849)	3.46 (1.029)	3.47 (1.007)	3.55 (1.002)	2.955	.008**
Designs in Vogue in the Sub-region	3.52 (0.680)	3.15 (1.109)	3.49 (1.120)	3.29 (1.088)	3.08 (1.238)	3.61 (0.970)	3.29 (1.213)	2.052	0.058
Newspapers and Television	3.90 (0.944)	3.57 (1.062)	3.47 (1.200)	3.47 (0.861)	3.36 (1.248)	3.72 (1.105)	3.14 (1.068)	2.894	0.009**

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$
The higher the mean, the higher the level of usage
(a) (Standard Deviations)

6.9.3.4 Marital Status and Choice of Style

T-test was conducted on the effect of marital status and the choice of style to compare the means of the respondents and the results are presented in Table 6.17. Levene's test indicated significant difference ($p < 0.05$) for some of the dependent variables such as western and traditional style catalogues and designs in vogue in the sub-region. A t-value revealed that there is significant difference among the means of the respondents, (2-tailed) with ($p < 0.05$) in variables such as western style, own creative design, dressmakers creative design and styles from newspapers, magazines and from the television.

The results revealed that unmarried respondents may be younger therefore would select their own styles and would prefer more western designs than married respondents who may be older therefore accept more traditional designs. Younger respondents may also

be more experimental with designs from non-traditional sources such as television, newspapers and magazines.

Table 6.17: Influence of Marital Status on the Choice of Style

Variables	Mean Scores		T-value	Levene's Test
	Single	Married		
Western Style Catalogues	2.37	1.96	3.642**	0.016
Traditional Style Catalogues	3.74	3.85	-1.109*	0.017
Own Creative Ability	3.58	3.19	3.736**	0.688
Dressmakers Creative Ability	3.24	3.51	-2.949**	0.752
Designs in Vogue in the Sub-region	3.25	3.35	-.916*	0.019
Newspapers and Television	3.65	3.30	3.384**	0.288

* Significance above 0.05
**Significance below 0.05
The higher the mean, the higher the level of Agreement (0.00-5.00)

6.10 The Importance of Garment Attributes

Attributes are important aspects in the general performance of a garment and may be used to determine the quality.

6.10.1 Descriptive Statistics for Garment Attributes

Descriptive statistics was used to determine the importance of garment attributes of the traditional dress. The results presented in Table 6.18 revealed that all six garment attributes are important to the respondents with mean scores ranging from 3.96 - 4.74. The results further suggest that garment fit scored the highest percentage (97.7%) and importance of price scored the least (77.0%).

It is interesting that the results on all the garment attributes have scored well over 50 percent which may suggest the high level of importance placed on garment attributes such as fit by the respondents.

Table 6.18: Percentage, Mean and Standard Deviation on Garment Attributes

Importance of Garment Attributes	Importance		
	Percentage	Mean Score	Standard Deviation
Garment fit	97.7	4.66	0.551
Quality of sewing	97.6	4.74	0.528
Fabric type and quality	92.8	4.46	0.769
Style details	92.6	4.47	0.736
Colour of fabric	88.4	4.20	0.861
Price	77.0	3.96	0.968

6.10.2 The Difference between Demographics and Garment Attributes

In order to analyse the demographic groups' differences on the importance of garment attributes for the traditional dress, a series of Analyses of Variance (ANOVA) were conducted using the respondent's demographic variables as the independent variables and the factors on garment attributes of the slit and kaba as the dependent variables.

6.10.3 Age and Garment Attributes

The results in Table 6.19 found age of the respondents significantly influence the garment attributes of the traditional dress. Among the attributes, quality of sewing ($F = 2.140$, $p < 0.05$) was the only variable found to be significant.

A post hoc Scheffe test further revealed that there were no significant differences among the means of all the age groups. Age does not seem to have any impact on the importance of garment attributes of the respondents' therefore this result is very significant and implies that attributes such as fit and quality of workmanship are very important to all the respondents irrespective of age

Table 6.19: ANOVA for the Influence of Age and Garment Attributes of Traditional Dress

	Mean Score and Standard Deviations of Age Groups								
Attributes	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**50-54**	**F-value**	**P**
Fit	4.59 (0.711)	4.76 (0.429)	4.54 (0.596)	4.74 (0.444)	4.76 (0.431)	4.63 (0.541)	4.70 (0.466)	1.978	0.067
Price	3.97 (.961)	4.01 (1.010)	3.87 (0.931)	4.13 (0.670)	3.78 (1.148)	4.11 (0.689)	3.60 (1.354)	1.589	0.149
Quality of sewing	4.76 (.594)	4.86 (.349)	4.71 (.537)	4.70 (.460)	4.80 (.404)	4.53 (.862)	4.73 (.450)	2.140	0.048*
Fabric type and quality	4.45 (.813)	4.43 (.844)	4.42 (.675)	4.38 (1.003)	4.44 (.577)	4.68 (.525)	4.60 (.621)	0.873	0.514
Style details	4.43 (.845)	4.55 (.642)	4.38 (.886)	4.46 (.647)	4.56 (.501)	4.34 (.878)	4.47 (.507)	0.732	0.624
Colour of fabric	4.22 (.824)	4.41 (.698)	3.87 (1.097)	4.23 (.804)	4.24 (.687)	4.18 (1.010)	4.23 (.679)	3.046	0.006**

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

The higher the mean, the higher the level of Agreement (0.00-5.00)

(a) (Standard Deviations)

6.10.4 Education and Garment Attributes

The results in Table 6.20 found age of the respondents significantly influence the importance garment attributes of the traditional dress among the educational groups. Among the attributes, fit of garment ($F = 2.637$, $p < 0.05$), price of garment ($F = 5.604$, $p < 0.001$) fabric type and quality ($F = 4.120$, $p < 0.01$) and style details ($F = 4.516$, $p \leq 0.001$) were found to be significant.

Scheffe test further revealed that there were significant differences among the means of some of the age groups. The test indicated that in terms of price, the group polytechnic was significantly different from the group university ($p < 0.05$). Similarly, in terms of fabric type and quality, the group secondary was significantly different from the group polytechnic and university at ($p < 0.05$). There were no significant differences among the means of educational groups in terms of fit, quality of sewing, style details and colour of fabric.

From the findings, one could conclude that significant differences exist among the educational groups in terms of price and fabric type as these two variables are mostly linked with one another. For example, Dutch print which is considered as the most expensive among all the wax prints is also considered as the finest and have the best quality.

Table 6.20: ANOVA for the Influence of Education on the Garment Attributes of the Traditional Dress

	Mean Score and Standard Deviations of Educational Groups						
Attributes	**Sec**	**Tech**	**Voc**	**Poly**	**Univ.**	**F-value**	**P**
Fit	4.82 (0.388)	4.60 (0.548)	4.43 (0.507)	4.71 (0.640)	4.61 (0.519)	2.637	0.034*
Price	4.24 (0.960)	4.00 (0.000)	3.52 (1.030)	4.15 (0.797)	3.79 (1.019)	5.604	0.000***
Quality of sewing	4.74 (0.443)	4.40 (0.548)	4.90 (0.301)	4.74 (0.587)	4.76 (0.430)	1.175	0.321
Fabric type and quality	4.80 (0.404)	5.00 (0.000)	4.24 (1.179)	4.44 (0.776)	4.39 (0.755)	4.120	0.003**
Style details	4.78 (0.465)	4.60 (0.548)	4.71 (0.463)	4.48 (0.745)	4.35 (0.761)	4.516	0.001**
Colour of fabric	4.28 (1.031)	4.00 (0.000)	3.81 (1.078)	4.31 (0.754)	4.14 (0.833)	2.190	0.069

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

The higher the mean, the higher the level of Agreement (0.00-5.00)

(a) (Standard Deviations)

6.10.5 Income and Garment Attributes

The results in Table 6.21 suggest that the income of the respondents significantly influence the garment attributes of the traditional dress among some of the variables which include fit of garment ($F = 4.276$, $p < 0.001$), price of garment ($F = 2.123$, $p < 0.05$) fabric type and quality ($F = 2.625$, $p < 0.05$). The Scheffe test however revealed no significant difference among the means of the income groups which again suggest that these garments attributes are important to all the respondents irrespective of their incomes.

Table 6.21: ANOVA for the Influence of Income on the Garment Attributes of the Traditional Dress

	Mean Score and Standard Deviations of Income Groups							F-value	P
Variables	<¢40.00	¢40.00-70.00	¢71.00-100.00	¢101.00-140.00	¢141.00-170.00	¢171.00-200.00	>¢201.00		
Fit	4.90 (0.301)	4.52 (0.687)	4.78 (0.417)	4.94 (0.239)	4.59 (0.669)	4.73 (0.445)	4.62 (0.488)	4.276	0.001***
Price	4.29 (0.644)	4.13 (0.928)	3.85 (1.096)	3.88 (0.913)	4.10 (0.794)	3.95 (0.881)	3.77 (1.087)	2.123	0.050*
Quality of sewing	4.86 (0.359)	4.74 (0.609)	4.76 (0.719)	4.79 (0.410)	4.69 (0.512)	4.72 (0.453)	4.76 (0.473)	0.416	0.869
Fabric type and quality	4.81 (0.402)	4.35 (0.919)	4.58 (0.762)	4.59 (0.783)	4.26 (0.855)	4.53 (0.503)	4.49 (0.719)	2.625	0.016*
Style details	4.71 (0.463)	4.52 (0.654)	4.45 (0.857)	4.26 (0.963)	4.43 (0.848)	4.64 (0.484)	4.45 (0.717)	2.013	0.063
Colour of fabric	4.29 (0.644)	4.26 (0.768)	4.18 (1.073)	4.26 (0.828)	4.21 (0.880)	4.22 (0.745)	4.14 (0.916)	0.231	0.967

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$
The higher the mean, the higher the level of usage
(a) (Standard Deviations)

6.10.6 Marital Status and Garment Attributes

Levene's test in Table 6.22 indicated significant difference ($p < 0.05$) for only one dependent variable of the garment attribute which is style details with a t-value of 2.641 which suggest that there are no significant differences among the means of the respondents among the other variables. It is therefore reasonable to conclude that marital status of the respondents does not influence their preference for the garment attributes of the slit and kaba.

Table 6.22: T-test for the Influence of Garment Attributes of the Traditional Dress

Variables	Mean Score		T-value	Levene's Test
	Single	Married		
Fit	4.69	4.63	1.094*	0.275
Price	4.00	3.93	0.739*	0.460
Quality of sewing	4.75	4.73	0.375*	0.708
Fabric type and quality	4.46	4.45	0.156*	0.876
Style details	4.56	4.39	2.641**	0.009
Colour of fabric	4.19	4.20	-.054*	0.957

* T-value Significant above 0.05
**T-value Significance below0.05

6.11 Usage of Slit and Kaba

In order to have a general overview about the usage of the slit and kaba, the respondents were asked to state the frequency of use in a week in an open-ended question. Although this dress is used alongside western dress, the results shown in Table 6.23 below indicated that a third of the respondents (38.8%) utilised this dress at least once in a week, (34.3%) twice and only two respondents utilise it six times (0.6%) in a week.

From the results one can infer that there is a significant usage of this dress by the respondents and underlines its importance.

The results suggest that since all the sample in this study were taken from the public sector it is assumed that majority of the respondents may wear western dress to work which is considered as the norm therefore the traditional dress may be utilised only over weekends which is responsible for the high usage for once or twice a week.

Table 6.23: Frequency of Usage of Traditional dress

Usage in a Week	Frequency	Percentage
0 Use in a Week	0	0
Once in a Week	137	38.8
Twice in a Week	121	34.3
3 Times in a Week	58	16.4
4 Times in a Week	24	6.8.
5 Times in a Week	11	3.1
6 Times in a Week	2	0.6
7 Times a week	0	0
Total	353	100

n = 353

6.11.1 Descriptive Statistics for Utilisation of Slit and Kaba

The use of slit and kaba as a traditional dress in Ghana varies according the occasion whether traditional or western. The respondents were asked to rank the usage of the slit and kaba for the various functions on a five-point Likert scale ranging from never to

very often. The results of each function were calculated and presented in Table 6.24 and revealed that the mean scores ranged from 1.51 to 4.65 and usage for funerals scored the highest percentage (92.0%) and usage for home scored the least (1.2%).

These results indicated a high level of utilisation for more traditional functions than for western functions which may be symbolized from the classification of this dress.

Table 6.24: Percentage, Mean and Standard Deviation on Usage of Slit and Kaba

Functions	Percentages	Mean Scores	Standard Deviations
Funerals	92.0	4.65	0.707
Church	81.2	4.29	0.862
Traditional Marriages	80.2	4.20	1.004
Naming Ceremonies	73.8	4.03	1.033
Traditional Festivals	67.5	3.91	1.315
Official Public Functions	30.6	2.92	1.261
Western weddings	29.9	3.08	1.169
Work	15.8	2.69	1.098
Parties	10.8	2.12	1.162
Shopping	4.8	2.09	0.979
Home	1.2	1.51	0.765

The higher the mean, the higher the level of usage (0.00-5.00)

6.11.2 The Relationship between Demographics and Usage

Analyses of Variance (ANOVA) were used to determine the effect of respondent's demographic on the usage of slit and kaba for the various functions.

6.11.2.1 Age and Usage of Traditional Dress

ANOVA revealed that the age of the respondents significantly influence the usage of the traditional dress as shown in Table 6.25. Almost all the variables were significant except western weddings which was not significant. Among the variables, home ($F = 5.962$, $p < 0.001$), shopping ($F = 16.592$, $p < 0.001$), work ($F = 10.160$, $p < 0.001$), church ($F = 4.401$, $p < 0.001$), funerals ($F = 8.860$, $p < 0.001$), traditional marriages ($F = 5.346$, $p < 0.001$), traditional festivals ($F = 13.437$, $p < 0.001$), naming ceremonies ($F = 3.506$, $p < 0.01$), parties ($F = 6.559$, $p < 0.001$) and official public functions ($F = 7.155$, $p < 0.001$) were found to be significant.

Scheffe test showed significant differences among the means of the age groups. In terms of usage for home, the group 20-24 was significantly different from the group 25-29 ($p < 0.05$), 30-34 ($p < 0.05$) and 45-49 ($p < 0.05$). Similarly, in terms of usage for shopping, the group 20-24 was significantly different from all the groups except 25-29

which was not significant. The group 25-29 was different from the group 45-49 ($p < 0.05$) in terms usage for shopping. The group 20-24 also differed from the group 25-29 ($p < 0.05$), 30-34 ($p < 0.001$), 40-44 ($p < 0.01$) and 45-49 ($p < 0.001$) in terms usage for work. Usage for church revealed significant differences among the groups 20-24 and 25-29 at ($p < 0.05$). The test further revealed a significant difference in the usage for funerals for the age group 20-24 from the group 25-29 ($p < 0.01$), 30-34 and 35-39 ($p < 0.01$), 40-44 and 45-49 ($p < 0.001$). Similarly, there was significant difference among the means in terms of usage for traditional marriages with age group 20-24 and groups 30-34 ($p < 0.5$), 40-44 ($p < .05$) and 50-54 ($p < 0.05$). There were also significant differences among the means in terms of usage for traditional festival with age group 20-24 and all the groups ($p < .01$). The group 20-24 also differed from the group 45-49 ($p < .001$) and 50-54 ($p < 0.05$) in terms usage for parties. Finally, the group 20-24 was different from the group 34-39 ($p < 0.05$), 35-39 ($p < 0.01$), 40-44 ($p < 0.05$) and 45-49 ($p < 0.001$) in terms usage for official public functions. The test showed no significant age difference on usage for western weddings and naming ceremonies.

It is evident from the findings that there is a high level of usage by the older respondents for the various functions especially the more traditional ones than the younger respondents. However, there was a notably significant level of usage by the younger respondents. One can conclude that there seem to be a very high significance and age has an impact on the utilisation of this dress

Table 6.25: ANOVA for the Influence of Age on the Usage of Traditional Dress

Variables	Mean Score and Standard Deviations of Age Groups							F-value	P
	20-24	25-29	30-34	35-39	40-44	45-49	50-54		
Home	1.19 (.555)	1.61 (.886)	1.72 (.910)	1.56 (.696)	1.32 (.513)	1.76 (.751)	1.57 (.679)	5.962	0.000***
Shopping	1.46 (.754)	1.86 (1.035)	2.33 (.863)	2.34 (1.063)	2.40 (.808)	2.50 (.830)	2.73 (.785)	16.592	0.000***
Work	2.11 (1.147)	2.69 (1.061)	3.10 (.948)	2.54 (1.010)	2.90 (.909)	3.29 (1.063)	2.77 (1.135)	10.160	0.000***
Church	4.14 (.891)	4.56 (.701)	4.32 (.890)	3.98 (1.025)	4.24 (.797)	4.53 (.687)	4.47 (.776)	4.401	0.000***
Western weddings	3.09 (1.322)	3.31 (1.134)	2.78 (1.180)	2.97 (1.183)	3.00 (1.107)	3.29 (.956)	3.20 (.997)	1.873	0.084
Funerals	4.27 (.982)	4.68 (.584)	4.72 (.737)	4.75 (.537)	4.88 (.328)	4.65 (.226)	4.87 (.434)	8.860	0.000***
Traditional Marriages	3.76 (1.214)	4.33 (.911)	4.36 (.789)	4.18 (1.057)	4.36 (.827)	4.29 (1.088)	4.60 (.621)	5.346	0.000***
Traditional Festivals	3.04 (1.534)	4.00 (1.149)	4.26 (1.098)	3.91 (1.366)	4.30 (.839)	4.47 (1.156)	4.48 (.829)	13.437	0.000***
Naming Ceremonies	3.67 (1.077)	4.17 (.975)	4.00 (1.140)	4.09 (1.014)	4.18 (1.004)	4.34 (.909)	4.20 (.887)	3.506	0.002**
Parties	1.62 (.993)	2.14 (1.239)	2.18 (1.266)	2.11 (.985)	2.26 (1.026)	2.79 (1.212)	2.53 (1.196)	6.559	0.000***
Official Public Functions	2.36 (1.286)	2.78 (1.284)	3.01 (1.211)	3.26 (1.109)	3.14 (1.107)	3.55 (1.108)	3.23 (1.331)	7.155	0.000***

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

The higher the mean, the higher the level of usage

(a) (Standard Deviations)

6.11.2.2 Education and Usage

The results shown in Table 6.26 indicated that there are significant differences amongst the five educational groups regarding variables such as home ($F = 4.913$, $p < 0.01$), shopping ($F = 22.219$, $p < 0.001$), work ($F = 21.280$, $p < 0.001$), funerals ($F = 7.375$, $p < 0.001$), traditional marriages ($F = 6.043$, $p < 0.001$), traditional festivals ($F = 11.655$, $p < 0.001$), naming ceremonies ($F = 5.876$, $p < 0.001$), parties ($F = 16.362$, $p < 0.001$) and official public functions ($F = 19.826$, $p < 0.001$). There were however no significant differences among the means for all the groups in relation to church and western weddings.

Scheffe test was used to determine the difference of means of the educational groups. The test indicated that for usage for home technical school is significantly different from polytechnic ($p < 0.05$). In terms for usage for shopping, secondary school is significantly different from vocational ($p < 0.01$), polytechnic ($p < 0.001$) and with university at ($p < 0.01$). Similarly, technical school differed from polytechnic at ($p < 0.05$) and polytechnic differed from university at ($p < 0.001$). Regarding usage for work secondary differed significantly for polytechnic at ($p < 0.001$) and polytechnic with university at ($p < 0.001$). In respect to usage for funerals, secondary differed significantly for polytechnic at ($p \leq 0.001$) and university with polytechnic at ($p < 0.01$). For traditional marriage usage differed significantly amongst the educational groups. Secondary school is significantly different from vocational ($p < 0.05$) and polytechnic at ($p \leq 0.001$). In relation to usage for traditional festivals, the group secondary and polytechnic differed at ($p < 0.001$) and polytechnic and university at ($p < 0.001$). The group secondary differed from the groups vocational ($p < 0.05$) and polytechnic ($p < 0.01$) in relation to usage for naming ceremonies. In terms for usage for parties, secondary school is significantly different from vocational, polytechnic and university all at ($p < 0.001$). Finally, in terms for usage for official public functions, secondary school is significantly different from vocational, polytechnic and university all at ($p < 0.001$). There is also a significant difference between the groups technical and vocational at ($p < 0.05$) and polytechnic and university at ($p < 0.05$).

The findings revealed that, the less educated respondents utilise slit and kaba for almost all the functions than the more educated respondents which is very significant although all the respondents have some sort of formal training.

Table 6.26: ANOVA for the Influence of Education on the Usage of Traditional Dress

Variables	Mean Score and Standard Deviations of Educational Groups					F-value	P
Variables	Sec	Tech	Voc	Poly	Univ.		
Home	1.62 (.805)	2.40 (.548)	1.29 (.644)	1.33 (.653)	1.55 (.775)	4.913	0.001**
Shopping	2.80 (.857)	3.00 (.000)	1.86 (1.062)	1.62 (.884)	2.24 (.880)	22.219	0.000***
Work	3.04 (.605)	3.40 (.548)	2.52 (.981)	2.11 (1.172)	3.02 (.922)	21.280	0.000***
Church	4.34 (.798)	4.00 (.000)	3.95 (.921)	4.25 (.840)	4.35 (.922)	1.297	0.270
Western weddings	3.44 (1.198)	3.00 (.000)	2.95 (.669)	3.12 (1.229)	3.04 (1.121)	1.342	0.253
Funerals	4.94 (.424)	5.00 (.000)	4.48 (.512)	4.44 (.869)	4.74 (.598)	7.375	0.000***
Traditional Marriages	4.66 (.593)	4.00 (.000)	3.86 (.964)	3.96 (1.073)	4.29 (1.012)	6.043	0.000***
Traditional Festivals	4.64 (.776)	4.40 (.548)	3.38 (1.161)	3.42 (1.455)	4.09 (1.265)	11.655	0.000***
Naming Ceremonies	4.48 (.974)	4.40 (.548)	3.52 (.680)	3.82 (1.003)	4.12 (1.075)	5.876	0.000***
Parties	3.24 (1.533)	2.40 (.548)	1.76 (.768)	1.83 (1.026)	2.09 (1.066)	16.362	0.000***
Official Public Functions	4.10 (1.266)	4.00 (.000)	2.19 (.873)	2.55 (1.236)	2.98 (1.129)	19.826	0.000***

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$
(a) (Standard Deviations)

6.11.2.3 Income and Usage

The results in Table 6.27 found income of the respondents significantly influence the usage of the traditional dress. Almost all the variables for the various functions were found to be highly significant except western weddings. Among the variables home was significant at ($F = 2.429$, $p < 0.05$), shopping ($F = 18.098$, $p < 0.001$), work ($F = 13.216$, $p < 0.001$), church ($F = 5.219$, $p < 0.001$), funerals ($F = 8.662$, $p < 0.001$), traditional marriages ($F = 6.802$, $p < 0.001$), traditional festivals ($F = 12.006$, $p < 0.001$), naming ceremonies ($F = 5.108$, $p < 0.001$), parties ($F = 7.890$, $p < 0.001$) and official public functions ($F = 8.076$, $p < 0.001$).

The results from the Scheffe test indicated that there are significant differences amongst the income groups in relation to the usage of slit and kaba. In terms of usage for shopping, the group <¢40 is significantly different from ¢171-200 ($p < 0.05$) and > ¢201 at ($p \leq 0.001$). Likewise, the group ¢40-70 is significantly different from ¢71-100 at ($p < 0.05$), ¢141-170, ¢171-200 and > ¢201 all at ($p < 0.001$). Also > ¢201 differed from

¢101-140 at ($p < 0.05$). In regards to usage for work, the group ¢40-70 differed significantly from the groups ¢141-170, ¢171-200 and > ¢200 all at ($p < 0.001$). Similarly, in terms of usage for church, < ¢40 differed from ¢171-200 ($p < 0.05$) and > ¢201 differed from ¢171-200 at ($p < 0.05$). In relation to usage for funerals, >40 differed significantly from ¢141-170 at ($p < 0.05$) and with > ¢201 at ($p \leq 0.001$). There is also significant differences amongst the groups ¢40-70 and ¢141-170 at ($p < 0.05$) and > ¢201 at ($p \leq 0.001$). Similarly the group ¢101-140 differed from ¢171-200 at ($p < 0.05$) and > ¢201 at ($p < 0.05$).

For traditional marriages the group ¢40-70 differed significantly from ¢141-170 at ($p < 0.001$) and > ¢201 at ($p < 0.001$). In relation to usage for traditional festivals, the group < ¢40 differed from > ¢200 at ($p < 0.05$) and the group ¢40-70 also differed from the groups ¢141-170, ¢171-200 and > ¢200 all at ($p < 0.001$). With regards to naming ceremonies, the group ¢40-70 differed significantly from > ¢201 at ($p < 0.01$) and ¢141-170 from ¢40-70 at ($p < 0.05$).

In terms for usage for parties, the group ¢40-70 is significantly different from ¢71-100 at ($p < 0.05$), ¢141-170 ($p < 0.001$) and > ¢201 at ($p < 0.05$). The group ¢101-104 also differed from ¢141-170 at ($p < 0.05$). Finally, in terms for usage for official public functions, < ¢40 is significantly different from ¢141-170 at ($p < 0.05$). The groups ¢40-70 is significant difference from ¢141-170 at ($p < .001$), ¢171-200 ($p < 0.001$) and >¢201 at ($p \leq 0.001$). There was no significant difference on usage for home and western weddings.

In conclusion, income seems to have a high impact on the traditional dress as those respondents with higher income utilise this dress more than those with lower income. This could be explained by the fact that owning this dress is linked to the ability to purchase the cloth and also pay for its workmanship by the dressmakers as this dress is custom made.

Table 6.27: ANOVA for the Influence of Income on the Usage of Traditional Dress

Variables	Mean Score and Standard Deviations of Income Groups							F-value	P
Variables	<¢40.00	¢40.00-70.00	¢71.00-100	¢101.00-140.00	¢141.00-170.00	¢171.00-200.00	>¢201.00		
Home	1.24 (.436)	1.41 (.744)	1.25 (.584)	1.65 (1.101)	1.53 (.753)	1.56 (.732)	1.64 (.757)	2.429	0.025*
Shopping	1.48 (.873)	1.39 (.741)	1.98 (1.027)	1.82 (.968)	2.38 (.881)	2.38 (.807)	2.49 (.945)	18.098	0.000***
Work	2.33 (1.354)	2.00 (1.069)	2.42 (1.301)	1.47 (1.080)	2.96 (.792)	2.97 (.975)	3.13 (.962)	13.216	0.000***
Church	3.81 (.873)	4.13 (.880)	4.45 (.789)	4.32 (.727)	4.50 (.723)	4.59 (.635)	4.11 (1.022)	5.219	0.000***
Western weddings	3.00 (1.000)	3.00 (1.222)	3.24 (1.261)	3.15 (.857)	3.19 (1.348)	2.86 (1.082)	3.07 (1.110)	0.768	0.595
Funerals	4.14 (1.062)	4.39 (.925)	4.60 (.494)	4.35 (.981)	4.77 (.562)	4.88 (.549)	4.86 (.399)	8.662	0.000***
Traditional Marriages	4.00 (1.000)	3.70 (1.126)	4.22 (1.212)	4.18 (.797)	4.42 (.912)	4.25 (.873)	4.50 (.805)	6.802	0.000***
Traditional Festivals	3.14 (1.236)	3.15 (1.390)	3.83 (1.404)	3.59 (1.559)	4.19 (1.131)	4.48 (.891)	4.26 (1.168)	12.006	0.000***
Naming Ceremonies	3.71 (1.102)	3.65 (1.010)	4.20 (.848)	3.68 (.912)	4.21 (1.002)	4.05 (1.061)	4.29 (1.055)	5.108	0.000***
Parties	1.81 (1.250)	1.57 (.829)	2.29 (1.257)	1.17 (.676)	2.57 (.1.341)	2.31 (.990)	2.13 (1.158)	7.890	0.000***
Official Public Functions	2.19 (1.209)	2.33 (1.091)	2.87 (1.277)	2.65 (1.178)	3.27 (1.339)	3.30 (1.019)	3.15 (1.302)	8.076	0.000***

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$
The higher the mean, the higher the level of usage
(a) (Standard Deviations)

6.11.2.4 Marital Status and Usage

A t-test was conducted on marital status to compare the means of the respondents and utilisation of traditional dress and the results are presented in Table 6.28. Levene's test indicated significant differences ($p<0.05$) for some of the dependent variables such as usage for work, funerals, traditional marriages and festivals, naming ceremonies and parties. A t-value revealed that there is significant difference among the means of the respondents, (2-tailed) with ($p < 0.05$) in all the variables except usage for home, church and western weddings. The results revealed that there is a high usage of traditional dress by married respondents than unmarried respondents which may imply that the usage of slit and kaba may be linked to gender roles and definition.

Table 6.28: Influence of Marital Status on the Usage of Traditional Dress

Variables	Mean Scores		T-value	Levene's Test
	Single	Married		
Home	1.44	1.57	-1.887*	0.280
Shopping	1.66	2.44	-9.444**	.289
Work	2.43	2.91	-4.726**	.000
Church	4.24	4.34	-1.230*	0.790
Western weddings	3.03	3.13	-.929*	0.286
Funerals	4.51	4.76	-3.773**	0.000
Traditional Marriages	3.97	4.39	-4.444**	0.013
Traditional Festivals	3.42	4.31	-7.471**	0.000
Naming Ceremonies	3.81	4.21	-4.200**	0.022
Parties	1.78	2.42	-6.207**	0.004
Official Public Functions	2.45	3.33	-7.991**	0.227

* T-value Significant above 0.05
**T-value Significance below0.05

6.12 Usage of Ready-to-Wear Clothes

In order to evaluate attitudes toward the acceptance of mass customisation of the traditional slit and kaba, the respondents were asked to rank the frequency of purchasing ready-to-wear clothes. The results in Table 6.29 indicated that 11.7 percent have never purchased, about half (53.8%) of the respondents sometimes purchase ready-to-wear clothes and about 22 percent often purchase these clothes.

Table 6.29 Frequency of the Purchase of Ready-to-Wear Clothes

Variables	**Frequency of Purchase**	**Percentage**
Never	55	11.7
Rarely	57	12.1
Sometimes	254	53.8
Often	74	15.7
Very often	32	6.8
Total	**472**	**100.0**

6.12.1 Acceptance of Mass Customisation

The subjects were asked about their views on the need for garment manufacturers to adopt the mass customisation strategy presented in Table 6.30. The results indicated that the majority of the respondents agreed to the need to mass customise the traditional dress which may be as a result of the problems of the current manufacturing process as stated in Section 6.2.4.

Table 6.30: Acceptance of Mass Customisation

Acceptance of Mass Customisation	Percentage Agreed	Percentage Disagreed
The need for mass customisation	69.4	30.6
Patronage of mass customisation	73.2	26.4

6.12.2 Descriptive Statistics for Statements on Mass Customisation

The respondents were asked to rank the statements relating to the mass customisation of the traditional dress on a five-point Likert scale from strongly disagree to strongly agree. These results are presented as descriptive statistics in Table 6.31 and indicated that the highest percentage was in promotion of the textiles industries (90.3%) and the lowest in affordability (39.2%). Similarly, the highest mean score is 4.32 and the lowest 2.69.

The results revealed that the creation of jobs and the promotion of traditional fabrics are the most important variables for the respondents although almost all the other variables have scored significantly well over 50 percent except affordability which scored 39.2 percent. These findings underline the importance of mass customisation of the traditional dress to the respondents and suggest that improvements of the garment attributes are very important.

Table 6.31: Descriptive Statistics for the Statements on Mass Customisation

Statements	Percentage Agreed	Mean Score	Standard Deviation
Availability	73.4	3.75	1.092
Improved fit	68.5	3.81	1.122
Improved quality	73.6	4.06	2.745
Affordability	39.2	2.69	1.190
Style varieties	80.2	4.03	0.819
Fabric varieties	81.2	4.03	0.800
Increased jobs	87.8	4.23	0.860
Promotion of textile industries	90.3	4.32	0.675
Promotion of traditional fabrics	86.3	4.29	0.845

(a) The higher the mean, the higher the level of Agreement

6.12.3 The Difference between Acceptance of Mass Customisation and Demographic Factors

In order to analyse the demographic groups' differences on the acceptance of mass customisation of traditional dress, a series of Analyses of Variance (ANOVA) were

conducted using the respondent's demographic variables as the independent variables and the statements on the acceptance of mass customisation of traditional dress as the dependent variables.

6.12.3.1 Age and Acceptance of Mass Customisation

The results found age of the respondents significantly influence the mass customisation of the traditional dress as shown in Table 6.32. Among the variables, fit ($F = 4.226$, $p < 0.001$), affordability ($F = 2.818$, $p < 0.05$), fabric variety ($F = 2.765$, $p < 0.05$) and promotion of traditional fabrics ($F = 4.555$, $p < 0.001$) were found to be significant.

Scheffe's test further revealed that there were significant differences among the means of the age groups. The results indicated that in terms of fit, age group 20-24 is significantly different from the groups 35-29 ($p < 0.05$) and 35-39 differed from 40-44 at ($p < 0.05$). In terms of affordability, the group 25-29 was significantly different from 40-44 at ($p < 0.05$). Similarly, in relation to promotion of traditional fabrics, age group 20-24 was significantly different from 35-39 at ($p < 0.05$). The group 35-39 also differed from the groups 30-34 at ($p < 0.05$), 40-44 ($p < 0.05$) and 50-54 at ($p \leq 0.01$). There was no significant difference in the means of the age groups in terms of availability, improved quality, variety of styles and fabrics, increased jobs and promotion of textile industries.

The results suggest that the younger respondents associated the mass customisation of the traditional dress more with improved fit and quality whilst the older respondents more with affordability, promotion of the textile industries and traditional fabrics. The younger respondents' choice of improved fit and quality of workmanship may be due to the preference for more fitted garments than the older respondents.

Table 6.32: ANOVA for the Influence of Age on the Mass Customisation of Traditional Dress

Variables	Mean Score and Standard Deviations of Age Groups							F-value	P
	20-24	25-29	30-34	35-39	40-44	45-49	50-54		
Availability	3.93 (1.020)	3.64 (1.010)	3.68 (1.253)	3.57 (1.284)	3.92 (.804)	3.87 (1.018)	3.90 (1.029)	1.332	0.241
Improved fit	4.08 (1.051)	3.87 (.950)	3.67 (1.286)	3.36 (1.291)	4.15 (1.042)	3.53 (.922)	3.77 (1.135)	4.226	0.000***
Improved quality	4.98 (5.313)	3.80 (.943)	3.79 (1.109)	3.44 (1.204)	4.04 (1.106)	3.84 (.945)	3.97 (1.159)	2.884	0.009
Affordability	2.94 (1.289)	3.26 (1.236)	2.81 (.994)	2.82 (1.133)	2.52 (1.074)	3.11 (1.290)	3.17 (1.234)	2.818	0.011*
Style varieties	4.13 (.810)	4.08 (.813)	3.85 (.869)	4.03 (.774)	4.00 (.833)	4.05 (.613)	4.23 (.898)	1.308	0.252
Fabric varieties	4.20 (.720)	4.06 (.802)	3.79 (.958)	4.03 (.752)	4.04 (.755)	3.87 (.414)	4.27 (.828)	2.765	0.012*
Increased jobs	4.32 (.884)	4.37 (.812)	4.17 (.828)	3.95 (.939)	4.28 (.671)	4.13 (.844)	4.13 (1.106)	1.973	0.068
Promotion of textile industries	4.38 (.707)	4.36 (.628)	4.28 (.701)	4.16 (.688)	4.26 (.694)	4.32 (.574)	4.50 (.731)	1.198	0.306
Promotion of traditional fabrics	4.29 (.884)	4.24 (.812)	4.35 (.828)	3.80 (.939)	4.42 (.671)	4.37 (.844)	4.60 (1.106)	4.555	0.000***

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$
The higher the mean, the higher the level of agreement
(a) (Standard Deviations)

6.12.3.2 Education and Acceptance of Mass Customisation

These results in Table 6.33 revealed that education of the respondents significantly influence the acceptance of mass customisation of the traditional dress between the

various age groups. Among the statements, improved fit of garment ($F = 3.927$, $p < 0.01$), improved quality of garment ($F = 2.394$, $p \leq 0.05$) promotion of textile industries ($F = 3.949$, $p < 0.01$) and promotion of traditional fabrics ($F = 2.862$, $p < 0.05$) were found to be significant.

Scheffe test further revealed that there were significant differences among the means of some age groups. The test indicated that in terms of improved fit, the group vocational was significantly different from the polytechnic ($p < 0.05$). Similarly, in terms of creation of jobs, the group secondary was significantly different from the group polytechnic university ($p < 0.05$). There were no significant differences among the means of educational groups in terms of other dependent variables. The findings revealed that education has a high impact on the mass customisation of the traditional dress with more educated respondents' preference for garment fit and workmanship and less educated respondents' preference for the creation of jobs

Table 6.33: ANOVA for the Influence of Education on the Mass Customisation of Traditional Dress

Variables	Mean Score and Standard Deviations of Educational Groups					F-value	P
Variables	Sec	Tech	Voc	Poly	Univ.		
Availability	3.76 (1.437)	2.80 (1.643)	3.29 (1.102)	3.81 (1.092)	3.77 (.978)	2.020	0.091
Improved fit	3.78 (1.200)	2.80 (1.643)	3.19 (1.436)	4.01 (1.049)	3.76 (1.135)	3.927	0.004**
Improved quality	3.96 (1.029)	2.80 (1.643)	3.57 (1.165)	4.62 (4.433)	3.78 (1.128)	2.394	0.050*
Affordability	2.50 (1.216)	3.20 (1.095)	3.00 (1.140)	2.97 (1.242)	3.01 (1.122)	1.995	0.094
Style varieties	4.04 (.989)	3.60 (.548)	3.86 (727)	4.04 (.874)	4.06 (.749)	.630	0.641
Fabric varieties	4.04 (1.106)	3.60 (.548)	3.76 (.889)	4.05 (.802)	4.07 (.679)	1.113	0.350
Increased jobs	3.94 (1.300)	3.60 (.548)	4.10 (.539)	4.38 (.786)	4.26 (.772)	3.599	0.007
Promotion of textile industries	4.48 (.707)	3.60 (.548)	4.10 (.539)	4.42 (.630)	4.26 (.711)	3.949	0.004**
Promotion of traditional fabrics	4.46 (.930)	3.60 (.548)	3.86 (1.062)	4.32 (.844)	4.25 (.791)	2.862	0.023*

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$
(a) (Standard Deviations)

6.12.3.3 Income and Acceptance of Mass Customisation

The results in Table 6.34 suggest that the income of the respondents significantly influence only two of the variables on the mass customisation of the traditional dress which include improved fit of garment ($F = 2.690$, $p < 0.05$) and improved quality ($F =$

3.190, $p < 0.01$). The Scheffe test further revealed that there is significant difference among the means in terms of improved fit of garment between the group ¢40.00-70.00 and >¢201.00 at ($p < 0.05$). Similarly, in terms of improved quality, the group ¢101.00-140.00 is different from >¢201.00 and ¢141.00-170.00 at ($p < 0.05$) and from >¢201.00 at ($p < 0.01$) which suggest that there are no differences among the means of the other variables.

Table 6.34: ANOVA for the Influence of Income on the Mass Customisation of Traditional Dress

	Mean Score and Standard Deviations of Income Groups							**F-value**	**P**
Variables	<¢40.00	¢40.00-70.00	¢71.00-100	¢101.00-140.00	¢141.00-170.00	¢171.00-200.00	>¢201.00		
Availability	3.62 (1.117)	3.78 (1.108)	3.82 (1.002)	3.29 (1.338)	3.87 (1.134)	3.84 (0.821)	3.73 (1.137)	1.341	0.237
Improved fit	3.81 (0.873)	4.07 (1.077)	3.91 (1.127)	3.62 (1.074)	3.91 (1.118)	3.80 (1.077)	3.49 (1.192)	2.690	0.014*
Improved quality	4.00 (0.894)	4.11 (0.919)	4.05 (1.061)	4.07 (1.077)	3.89 (0.999)	3.84 (0.963)	3.71 (1.236)	3.190	0.004**
Affordability	3.43 (1.121)	2.76 (1.345)	3.00 (1.347)	3.06 (1.324)	2.99 (1.096)	3.00 (0.873)	2.96 (1.206)	1.050	0.392
Style varieties	4.00 (0.894)	3.93 (0.823)	4.15 (0.826)	3.94 (0.983)	4.11 (0.756)	4.09 (0.583)	4.03 (0.906)	0.659	0.683
Fabric varieties	4.10 (0.944)	4.00 (0.864)	4.07 (0.920)	3.85 (0.925)	4.10 (0.735)	4.02 (0.577)	4.06 (0.787)	0.476	0.826
Increased jobs	4.19 (1.167)	4.30 (0.861)	4.49 (0.742)	4.32 (0.768)	4.07 (1.036)	4.17 (0.788)	4.17 (0.758)	1.702	0.119
Promotion of textile industries	4.29 (0.902)	4.33 (0.631)	4.51 (0.573)	4.44 (0.613)	4.31 (0.729)	4.23 (0.636)	4.27 (0.721)	1.158	0.327
Promotion of traditional fabrics	4.19 (1.167)	4.17 (0.820)	4.33 (0.721)	4.32 (0.878)	4.41 (0.792)	4.28 (0.786)	4.20 (0.926)	8.845	0.536

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$
The higher the mean, the higher the level of usage
(a) (Standard Deviations)

6.12.3.4 Marital Status and Acceptance of Mass Customisation

Levene's test in Table 6.35 indicated significant difference ($p<0.05$) for only one dependent variable in terms of increased jobs with a t-value of 4.061 which suggest that there are no significant differences among the means of the respondents among the other variables.

6.35: T-test for Marital Status and Acceptance of Traditional Dress

Variables	Mean Scores		T-value	Levene's Test
	Single	Married		
Availability	3.69	3.80	-1.154*	0.249
Improved fit	3.90	3.73	1.577*	0.115
Improved quality	4.34	3.82	1.899*	0.059
Affordability	3.04	2.88	1.418*	0.157
Style varieties	4.02	4.04	-0.208*	0.835
Fabric varieties	4.05	4.02	0.366*	0.715
Increased jobs	4.41	4.09	4.061**	0.001
Promotion of textile industries	4.38	4.29	1.425*	0.155
Promotion of traditional fabrics	4.20	4.34	-1.736*	0.083

* T-value Significant above 0.05
**T-value Significance below0.05

6.13 Summary of Findings Consumers Questionnaire

The data from the questionnaire was gathered on order to evaluate consumers' attitude towards the traditional dress in relation to mass customisation. The response rate for the returned questionnaire was high (95.6%) and represents the age group distribution of the sampled population. Most of the respondents in this study earned income above the minimum monthly wage in Ghana and a little over half of the respondents were married which well represents the actual population.

The meanings attached to the slit and kaba were found to be socio-cultural and include Ghanaian identity and heritage, respect, financial status and admiration among others. The results revealed that the age, marital status and education of the respondents significantly influenced the meaning of the traditional dress as married and older respondents associated this dress more with respect, financial status and reflection of age.

In terms of the development of the slit and kaba, it was observed that there were significant changes in design and fabrics usage with younger respondents' preference for western designs and older respondents more traditional styles. It is interesting to note that all the six factors of development listed in this study were found to have significant influence on the development of the slit and kaba. Similarly, all the six garment attributes were found to be important as neither age nor education seem to have

any impact on their preference. Therefore these results are very significant and implies that fit and quality of workmanship may be very important attributes irrespective of age, education, income and marital status.

In terms of the utilisation of this dress, the results indicated a high level of usage for more traditional functions and may symbolise its classification as a traditional dress. However, age and marital status were found to have significant influence on its usage as older and married respondents tend to utilise this dress more than younger respondents. Similarly, less educated respondents seem to utilise this dress more than the very educated respondents.

With regards to mass customisation, more than half of the respondents were in favour of the adoption of this production strategy and were willing to utilise such services should they become available in the near future. There was a general consensus among the respondents that mass customisation could be a panacea for the improvement of fit and quality standards of the slit and kaba in particular and the garment sector in Ghana as a whole.

The slit and kaba from this survey is a way that Ghanaian women communicate their identities as a social group but at the same time express individuality. There seem to be a major relationship between the symbolic meaning and the utilisation of the traditional dress which may be used to signify gender roles and societal expectations of women which is deeply embedded in cultural practices.

6.14 Results from Focus Group Interviews

The finding generated from the focus group interviews with the consumers are presented in this section and all interviewees are referred to as participants. The findings are presented under the general theme of the interview guide in (Appendix 4c).

6.14.1 Meaning and Evolution of Traditional Dress

The findings from the focus group interviews in relation to the meaning of traditional dress suggest that the participants associate the traditional dress with culture, Ghanaian and ethnic identities which may be a function of the importance placed on the usage of

this dress. It is worth noting that most of the participants believe the slit and kaba is the acceptable code of dress for the Ghanaian woman especially for traditional and state functions. Thus the usage of the traditional dress may be related to gender specific prescribed dress for role specification.

Statements such as "it is our culture and that is what our forefathers were wearing" (FG03) and "it is our traditional attire that we have known for years" (FG01) indicate a strong link with culture and underpins the relationship between dress usage and associated meaning. This implies that this dress functions more than a covering and may be used to associate with a particular cultural transmission and the preservation of that system which is seen in the use of words such as roots and background to denote a sense of belonging or group membership. It was also evident that most of the participants use this dress to portray status from their statement like "it makes you look responsible and respectable" (FG05) which may be related to the enhancement of the individuals self esteem which is central in the construction of status. The reference to maturity was also identified as a key determinant in the usage of the traditional dress as the participants believe it reflects their status as adults.

In terms of the evolution of the traditional dress, the participants believed the current state of the slit and kaba is different and could be considered as a "modified version of the cloth our mothers wore" (FG 05) and has changed "a lot from the way we know slit and kaba to be" (FG03). This implies that, the slit and kaba was previously made to conform to a particular form and fit, therefore the deviation from that state suggests a change. It is worth noting that the changes have been associated with western dress, globalisation and technology that have directly influenced the form and fit of this dress.

An older participant said to a younger member of the group during one of the discussions on the change in form and fit "you see because you are young you have not really seen the old styles, but I believe the styles have been simplified a lot to suit the modern times" (FG 01). This is a clear indication of having a good representation of all the age groups as the selection or over representation of one age group could affect the findings since the topic under discussion was related to time based observations. Another participant said "the styles have become simpler and therefore could be used for other non-traditional functions like work" (FG03). This statement supports the findings of the questionnaire that the traditional dress is mostly used for traditional functions in Section 6.5.1. It is reasonable to conclude that the evolution of the

traditional dress has made it more practicable for everyday use which was previously not the case and suggest that the traditional dress has evolved into its current stage.

6.14.2 Manufacture of Slit and Kaba

It is evident from the analysis of the focus group interviews that the slit and kaba is mainly produced as a custom dress using the consumer's specifications and body measurements. With this process, the consumers' buy their own fabrics or cloth, select a design and their measurements are taken and used for the manufacture of the slit and kaba as explained in this excerpt "at the moment there's a high incident of people buying their own fabrics and looking for dressmakers and telling them what to do" (FG05). The results suggest that this procedure of buying ones fabric does not only pertain to the slit and kaba but to other types of garments as well therefore one may conclude that the custom made is the general system of production for all types of garments in Ghana.

In terms of anthropometric data, the participants indicated that their individual body measurements are taken and used for the manufacture of their slit and kaba. In relation to how these measurements are obtained, the general views were in line with these statements: "The dressmaker takes your measurement and sometimes it is the senior apprentice" or "Our measurements are taken in whatever dresses you are wearing and only on few occasions are you told it is too bulky". These statements underline the utilisation of the custom made procedure and may explain the general manner in which anthropometric data are obtained. Furthermore, the participants indicated that the same number of measurements is taken for both western and traditional garments although additional measurements may be taken for garments such as the trousers.

The participants generally agreed to the change in form and fit of the slit and kaba and have observed that the designs have been simplified. However, this simplification may have come with a price which is expressed in this statement; "The style lines have changed so it has become more difficult, the slit and kaba may be simplified but the fit is more difficult now" (FG 03). Another participant said 'with the loose kaba it was easy but the fitted ones are more difficult to make' (FG 03) and 'the level of our 'roadside' dressmakers are not enough to cope with the current change in fit' (FG 01). The term 'roadside' is used to describe dressmakers who learn through informal

apprenticeship in Ghana. All of the above statements reiterate the evolution of the slit and kaba in relation to fit and form and suggest the level of difficulty in its construction due to these changes.

One would expect that since the slit and kaba is produced with the individual's body measurements, there should be few problems with the fit of the garment. However, the participants from all the focus groups explained that they were generally unhappy with the fit of their slit and kaba and would have to return them to be corrected most of the time and the level of finishing is equally poor. These problems are expressed in the following statements; "you see it is difficult to find a dressmaker who takes your body measurement and sew for you and it fits perfectly without alterations" (FG 05) or "most of the dressmakers are not able to interpret styles chosen correctly as they may sew something different for you" (FG 03). Another participant said:

> You know those dressmakers at the 'roadside' when you see a style and you describe it to them they don't always get it right because of their level of training so I personally do not like these dressmakers as they make too many mistakes (FG 01).

The participants attributed some of these problems to inefficient formal education as the general notion of most Ghanaian's is that "only drop outs from formal education should go into apprenticeship as dressmakers" (FG 01). Some of the problems listed include the following:

1. Problems with fit
2. Motifs are not properly matched in the garment
3. Poor quality of garment finishing
4. Skills acquired through apprenticeship is low and inhibits creativity
5. Low level of formal education
6. Deception as to when garments should be collected from dressmakers
7. Styles chosen are not always well interpreted
8. Lack of pattern making skills which results in poor fit
9. Fabrics are sometimes spoilt and wasted as free hand cutting is used.

Apart from the problems listed above, most of the participants stated they were generally dissatisfied with the services received from their dressmakers as expressed in the following statements:

1. Garments are never finished on time, they deceive you a lot
2. The motifs in the cloth are not matched and positioned properly and often the motifs may be turned upside down

3. They give your dress to apprentices who are still learning to sew as a result your dress is not well sewn
4. I hate it when an apprentice sews my dress and I can tell if it is made by the dressmaker herself
5. It is a big problem because they don't make the dresses themselves as they give it to unqualified people to sew
6. The finishing is bad and it is a problem.

The above statements portray a general dissatisfaction with the services received by the participant and suggest the lack of good customer service and problems with garment attributes such as fit, workmanship and quality.

6.14.3 Development of a Sizing System

The data generated from the focus group interviews with regard to the development of a sizing system for the slit and kaba is presented in this section. The findings revealed that most of the participants agreed to the utilisation of ready-to-wear garments. They however expressed the frustrations encountered in the purchasing of these garments as a result of the inconsistencies in its sizing. These are expressed in the following statements "it is so confusing as size is just a number as the sizes are not standardised" (FG 03) and "it is even more confusing if it is labelled as Small, Medium and Large type of sizing" (FG 01). Another participant stated:

> You may not have a disproportionate figure but because the sizing are not the same you may end up buying two different sizes for separates so you need to try everything on before you buy (FG 05).

These statements are clear indications of the frustrations that the participants go through in order to select garments that fit properly. This may be due to the inconsistencies in the sizing systems as manufacturers tend to use different sets of body measurements as a competitive advantage therefore the actual measurements may be kept secret which creates the variations among the manufacturers. It may also be due to the variations in the size labelling systems that makes them confusing for consumers to identify the right size of garments that fit their body dimensions.

The findings further revealed that the participants generally agreed to the need to develop a sizing system specifically for the Ghanaian woman as a result of the above mentioned problems. However, the participants expressed other problems which were linked to the fit of garments at certain body positions due to differences in body shapes. This is observed from the following statements "the African figure types are different so that we can also have dresses that fit us properly" (FG 03) and "I think because western sizes are used and as their figure is different from ours, we have larger hip area so most of the time the hip on skirts and trousers do not fit us" (FG 05). It is evident from these statements that the participants have observed differences in figure types of Ghanaian women and that of the western figure which necessitates the development of a sizing system in order to cater for this target group. The findings also revealed that the participants believe the development of a sizing system for women in Ghana will facilitate the production process and in turn promote the garment sector in general.

6.14.4 Mass Customisation of Traditional Dress

The data gathered from the three focus group interviews suggest that the participants are of the view that mass customisation could be used as a strategy to reorganise the garment sector. However, majority of the participants expressed the fear that the cost of garment production could become higher as the quality improves. They expressed the interest in mass customisation and would patronise it if this service becomes available.

However, the participants from the focus groups categorically stated that they would not like the slit and kaba to be mass produced as the styles will become too common and that individual taste peculiar to the traditional dress will be lost as expressed in this excerpt "you see mass production does not take care of individuals figure, fabric and style" (FG 05). Another said "no, we will not like the slit and kaba to be mass produced as it may lose its cultural value" (FG 03). These statements are a strong indication of the rejection of the mass production of the traditional dress which may be the result of product standardisation which does not take individual preferences into consideration. Another clear indication was the association of the traditional dress to the preservation of cultural values which is symbolic of this dress.

As a result of the above view points, most of the participants generally agreed to the adoption of mass customisation for the production of the slit and kaba. The preference for mass customisation is shown in the following excerpts:-

> I definitely prefer mass customisation as it is like what is already done with the slit and kaba and I will be sure of the fit because my personal measurements are used according to my choice of style and fabric (FG 03).
>
> With mass customisation the fit will be better and the production faster than the individual dressmakers that we have now and the producers will be sure of getting their money as people sometimes do not go for the dresses after it is made so mass customisation will benefit both the producer and the consumer (FG01)

The participants suggested that mass customisation is needed as this may improve the quality and fit of garments as this will be produced by qualified dressmakers and that the garment sector could be restructured and only qualified dressmakers will be employed.

The findings revealed that the most important garment attribute is fit and good finishing. Listed below are some of the benefits the participants believed could be achieved through mass customisation:

1. Improved fit of garment as the individuals' body measurements will be used.
2. Improved quality of sewing and finishing
3. Garments/fabrics will no longer be spoilt
4. The individual's preference for styles and fabrics will still be available which is unique to the traditional dress
5. Garments will continue to be custom-made
6. Garments will be produced by qualified dressmakers
7. It will be easier to obtain professional advice
8. Employment will be generated
9. Mass customisation will improve the garment industry in general
10. Mass customisation will increase the usage of the traditional dress as the quality and fit improves.

6.15 Summary of Findings from Focus Group Interviews

The findings of the focus group interviews also established the use of custom made process of manufacturing in which the consumer provides the fabric with the choice of preferred design. It appears that the ready-to-wear market is not well developed in Ghana and explains the lack of sizing system and standards in garment manufacture as found in Section 6.7. There is also evidence which confirms the evolution of the slit and kaba and suggests that the designs have become more simplified but more difficult to manufacture in terms of fit. Although the custom made system is utilised, it is interesting that there seem to be problems with fit and the quality of workmanship in

general which the consumers of the traditional dress are unhappy with. The problem with fit could be due to the number of body measurements normally taken as observed in Table 6.5 and the method employed in the utilisation of the anthropometric data (free hand cutting). However, the participants attributed some of these problems to the level of formal education attained by some the manufacturers and also the type of training received through the apprenticeship system. The consumers are also not satisfied with the use of unqualified apprentices as observed in Section 6.14.2 which affects the aesthetic quality and fit of the traditional dress.

The findings further revealed that the participants experience problems with the inconsistencies in the sizing systems and fit of ready-to-wear garments. These problems may be linked to the differences in the body form of the western figure and that of the Ghanaian woman.

CHAPTER 7 Presentation and Analysis of Anthropometric Data

7.1 Introduction

The process of developing body size charts involves the collection of anthropometric data for the target population and dividing them into homogeneous groups for the purpose of clothing manufacture. In the current chapter, data from the pilot study involving the body measurements of 60 women are presented as well as the data of the main anthropometric survey of 600 women and the procedure used for the development of the size chart.

7.2 Results of Pilot Study

The pilot study involved taking 21 body dimensions of 60 Ghanaian women and correlation co-efficient was utilised to determine strength of relationships between the body parts. The correlation coefficient was utilised to observe the interrelationships between the various body dimensions in order to determine key dimensions or controlled measurements. This study adopts the BS 7231 (BSI, 1990) standard as a guideline for identifying strength of relationships between the variables which was utilised in previous surveys by Beazley (1998), Otieno (1999), Otieno and Fairhurst (2000) and Gupta and Gangadhar (2004). For the purpose of this study, the correlation is defined as:

1. Below 0.5 indicates no relationship;
2. From 0.5 to 0.75 indicates a mild relationship;
3. Above 0.76 indicates a strong relationship.

The data from the survey were calculated using the SPSS program version 12 (Statistical Package for the Social Sciences). Table 7.1 illustrates results of body dimensions with only strong correlations which are normally used in determining key dimensions or controlled measurements for body charts as used in previous studies (Beazley, 1998; Otieno, 1999; Otieno and Fairhurst, 2000 and Gupta and Gangadhar, 2004).

Table 7.1: Correlation Co-efficient of Body Dimensions with strong relations

Body Dimensions	Body Dimensions and Correlation Co-efficient										
	Weight	Height	Chest Girth	Bust Girth	Under Bust	Waist Girth	Lower Hip Girth	Upper Hip Girth	Thigh Girth	Upper Arm Girth	Waist to Ankle
Weight	1	-	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	-
Height	-	1	-	-	-	-	-	-	-	-	0.8
Chest girth	0.8	-	1	0.9	0.8	0.8	0.8	0.8	0.8	0.8	-
Bust girth	0.8	-	0.9	1	0.9	0.8	0.8	0.8	0.8	0.8	-
Under bust	0.8	-	0.8	0.9	1	0.9	0.8	0.8	0.8	0.8	-
Waist girth	0.8	-	0.8	0.8	0.9	1	0.8	0.8	0.8	0.8	-
Lower hip girth	0.9	-	0.8	0.8	0.8	0.8	1	0.9	0.9	0.8	-
Upper hip girth	0.8	-	0.8	0.8	0.8	0.8	0.9	1	0.8	0.8	-
thigh girth	0.9	-	0.8	0.8	0.8	0.8	0.9	0.8	1	0.8	-
Upper arm girth	0.8	-	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1	-
Waist to ankle	-	0.8	-	-	-	-	-	-	-	-	1

n = 60

Correlation is significant at $\alpha = 1\%$ (2-tailed).
Measurements are in centimetres except weight which is in kilograms.

The results of the pilot study further suggest that the bust, waist and hip girths have strong correlations with other body dimensions (except height and waist to ankle) and could be used as key dimensions. Waist to ankle is however the only linear dimension that has a strong correlation with the height. These results are different from Beazley (1998) and Otieno (1999) studies in terms of the correlations between the height and other linear dimensions. However, this could be due to the fact that the other studies measured more linear dimensions than in the current study.

The results of the correlation coefficient of the pilot studies suggest the same body dimensions could be maintained for the main anthropometric survey of the current study.

7.3 Results of the Main Study

The main anthropometric survey measured the 21 body dimensions (used in the pilot study) for 600 Ghanaian women between the ages of 20-54 years. The results of the mean, median, mode, minimum, maximum, and standard deviation of all the body dimensions are presented in Table 7.2.

Table 7.2: Key Descriptive Statistics from the Raw Data of 600 Women

Body Dimensions	Mean	Median	Mode	Standard Deviation	Maximum	Minimum
Weight	66.1	62.6	52.0	15.0	123.0	41.0
Height	158.2	158.0	159.0	6.1	177.0	140.0
Neck girth	33.1	33.0	34.0	2.2	38.5	27.0
Shoulder width	39.0	39.0	40.0	2.3	44.5	34.0
Shoulder length	13.5	13.5	14.0	1.2	16.2	11.0
Across Chest	33.5	33.0	34.0	2.9	40.0	27.0
Chest Girth	88.0	87.0	81.0	8.1	110.5	71.0
Across Back	36.6	36.5	36.0	3.3	45.5	29.0
Bust Girth	92.3	91.00	83.0	9.8	114.1	72.0
Under Bust	77.7	76.0	74.0	8.4	100.0	63.0
Waist Girth	78.3	76.0	67.0	11.1	103.5	59.0
Lower Hip Girth	101.0	100.0	99.0	10.7	126.5	75.0
Upper Hip Girth	90.9	89.0	88.0	11.1	116.0	67.0
Thigh Girth	59.9	59.0	63.0	7.8	79.0	41.0
Front Waist Length	40.5	40.0	40.0	3.4	49.0	33.0
7^{th} Cervical to Waist	37.8	38.0	38.0	2.4	44.0	31.0
Upper Arm Girth	30.7	30.0	27.0	5.0	46.0	20.5
Wrist Girth	15.8	16.0	16.0	1.2	20.0	13.0
Acromion to Wrist	60.7	61.0	60.0	3.2	68.0	51.0
Side waist to Knee	58.7	59.0	57.0	3.7	69.0	47.0
Side waist to Ankle	99.7	100.0	102.0	4.7	112.0	83.0

n = 600

Measurements are in centimetres except weight which is in kilograms.

The result from the data concludes that the sample's mean weight was: 66.1 kilograms, the minimum weight was: 41.0 kilograms and the maximum weight is: 123.0. The mean height is: 158.2 cm, the minimum height was: 140.0 cm and the maximum height was: 177.0 cm. The results in Table 7.2 further suggest that the sample's mean bust girth was: 92.3 cm, the mean waist girth was: 78.3 cm and the mean lower hip girth was 101.0cm. The median however for the bust girth was: 91.0cm, with the waist girth 76.0cm and the hip girth 100.0cm respectively which are lower than those of the mean. These measurements are central in the development of sizing systems as they are normally used as the average size from which other sizes are derived.

7.3.1 Percentiles of Body Dimensions

Percentiles are values representing a percentage of a given population and give an indication of the spread of range and distribution which are important in estimating the degree of coverage for a particular population (Winks, 1997). In terms of development of a size chart, the percentile values are crucial in determining the extent of coverage for the population. In Table 7.3, the percentile values for all the body dimensions of the 600 subjects are presented which include the 5^{th}, 25^{th}, 50^{th}, 60^{th}, 75^{th}, 80^{th} and 95^{th} percentiles of the body dimensions. The figures have been rounded up or down to the nearest whole number for easier calculations.

Table 7.3 : Percentiles of Body Dimensions

Body Dimensions	Percentiles						
	5	**25**	**50**	**60**	**75**	**80**	**95**
Weight	47	55	63	67	75	79	94
Height	148	154	158	160	162	163	169
Neck Girth	30	31.5	33	34	35	35	37
Shoulder Width	35	37	39	40	41	41	43
Shoulder Length	11.5	12.5	13.5	14	14	14.5	16
Across Chest	29	31	33	34	35.5	36	39
Chest Girth	76	82	87	89	94	96	102
Across Back	31.5	34	36.5	37	39	40	43
Bust Girth	77	85	91	94.5	100	101.5	110
Under Bust	66	71.5	76	78.5	83	84.5	94
Waist Girth	63	69	76	80	86	89	99
Lower Hip Girth	85	93	100	103	108	110	121
Upper Hip Girth	74	82.5	89	92.5	99	102	111
Thigh Girth	48	54	59	61.5	66	67	74
Front Waist Length	35	38	40	41	43	43	47
7^{th} Cervical to Waist	34	36	38	38	39.5	40	42
Upper Arm Girth	23.5	27	30	31.5	34	35	39.5
Wrist Girth	14	15	16	16	16.5	17	18
Acromion to Wrist	55.5	58.5	61	62	63	63	66
Side waist to Knee	52	56	59	60	61	62	65
Side waist to Ankle	92	97	100	101	103	104	108

n = 600

Measurements are in centimetres except weight in kilograms.

From the results in Table 7.3, the 50th percentile represents the median; however the mean is used for the purpose this study. Therefore in order to accommodate 80% of the population, a range may be designed to cover between the 5th and the 85th percentiles of between the 10^{th} and the 90^{th} percentiles which will exclude 20% of the target population.

7.4 Analysis of Body Measurements

Multiple coefficient analysis was utilised to measure interrelationships between the various body dimensions in order to determine the key dimensions. As already discussed in Section 7.1, the BS 7231 (BSI, 1990) standard was used as a guideline to identify strength of the relationships. The results of the correlation coefficient of all body dimensions of the main anthropometric survey showing the strength of relationships are presented in Tables 7.4 and 7.5.

Table 7.4: Correlation Co-efficient of Body Dimensions (two tailed)

Body Dimensions	Weight	Height	Neck Girth	Shoulder Width	Shoulder Length	Across Chest	Chest Girth	Across Back	Bust Girth	Under Bust Girth	Waist Girth
Weight	1	.29	.75	.52	.27	.73	**.90**	.75	**.89**	**.88**	**.90**
Height	.29	1	.27	.26	.20	.19	.16	.25	.15	.16	.10
Neck Girth	.75	.27	1	.54	.34	.61	.73	.64	.70	.69	.64
Shoulder Width	.52	.26	.54	1	.56	.39	.53	58	.48	.47	.46
Shoulder Length	.27	.20	.34	.56	1	.26	.23	.26	.25	.20	.20
Across Chest	.73	.19	.64	.39	.26	1	.75	.53	.72	.72	**.76**
Chest Girth	**.90**	.16	.73	.53	.23	.75	1	**.78**	**.93**	**.89**	**.90**
Across Back	.75	.21	.64	.58	.26	.53	.78	1	.74	.71	.73
Bust Girth	**.89**	.15	.70	.48	.25	.72	**.93**	.74	1	**.90**	**.96**
Under Bust	**.88**	.16	.69	.47	.20	.72	**.89**	.71	**.90**	1	**.91**
Waist Girth	**.90**	.10	.69	.47	.20	**.76**	**.90**	.73	**.90**	**.91**	1
Lower Hip Girth	**.91**	.17	.64	.45	.24	.64	**.83**	.66	**.82**	**.79**	**.81**
Upper Hip Girth	**.90**	**.13**	**.64**	**.45**	.22	.70	**.87**	.66	**.87**	**.86**	**.88**
Thigh Girth	**.82**	.15	.58	.42	.21	.56	.74	.61.	.74	.71	.72
Front Waist Length	.68	.32	.58	.43	.38	.58	.63	.52	.38	.38	.39
7thCervical to Waist	.44	.42	.39	.40	.28	.36	.41	.40	.38	.38	.39
Upper Arm Girth	**.86**	.04	.67	.45	.21	.68	**.85**	.67	**.84**	**.82**	**.86**
Wrist Girth	**.76**	.22	.60	.42	.22	.57	.70	.57	.68	.69	68
Acromion to Wrist	.43	.60	.31	.22	.55	.34	.36	.35	.34	.38	.34
Side waist to Knee	.28	.46	.22	.15	.12	.19	.19	.19	.18	.18	.15
Side waist to Ankle	.24	.75	.23	.21	.14	.17	.15	.17	.13	.14	.08

n = 600

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

(Strong correlations are highlighted)

Measurements are in centimetres except weight which is in kilograms.

Table 7.5: Correlation Co-efficient of Body Dimensions (two tailed) Continued

Body Dimensions	Lower Hip Girth	Upper Hip Girth	Thigh Girth	Front Waist Length	7th Cervical to Waist	Upper Arm Girth	Wrist Girth	Acromion to Wrist bone	Side Waist to Knee	Side Waist to Ankle
Weight	**.91**	**.90**	**.82**	.68	.44	**.86**	**.76**	.43	.28	.24
Height	.17	.13	.15	.30	.42	.04	.22	.60	.46	.75
Neck Girth	.64	.64	.58	.58	.39	.67	.60	.31	.22	.23
Shoulder Width	.45	.45	.42	.43	.40	.45	.42	.22	.15	.21
Shoulder Length	.24	.22	.21	.38	.28	.21	.22	.05	.12	.14
Across Chest	.64	.70	.56	.58	.36	.68	.57	.34	.19	.17
Chest Girth	**.83**	**.87**	.74	.63	.41	**.85**	.70	.36	.19	.15
Across Back	.66	.70	.61	.52	.40	.67	.57	.35	.19	.17
Bust Girth	**.82**	**.87**	.74	.70	.38	**.84**	.68	.34	.18	.13
Under Bust Girth	**.79**	**.86**	.71	.63	.38	**.82**	.69	.38	.18	.14
Waist Girth	**.81**	**.88**	.72	.65	.39	**.86**	.68	.34	.15	.08
Lower Hip Girth	1	**.89**	**.85**	.60	.37	**.83**	.69	.35	.26	.17
Upper Hip Girth	**.89**	1	**.82**	.63	.37	**.84**	.69	.34	.17	.12
Thigh Girth	**.85**	**.82**	1	.51	.32	**.76**	.62	.34	.23	.15
Front Waist Length	.60	.63	.51	1	.43	.58	.52	.32	.20	.15
7thCervical to Waist	.37	.37	.32	.43	1	.33	.34	.39	.22	.30
Upper Arm Girth	**.83**	**.84**	**.76**	.58	.33	1	.70	.27	.14	.04
Wrist Girth	.69	.69	.62	.52	.34	.70	1	.33	.20	.13
Acromion to Wrist	.35	.34	.33	.32	.39	.27	.33	1	.45	.58
Side waist to Knee	.26	.17	.20	.20	.22	.14	.20	.45	1	.58
Side waist to Ankle	.17	.12	.15	.15	30	.04	.13	.58	.58	1

n = 600

Correlation is significant at the 0.01 level (2-tailed).
(Strong correlations are highlighted)
Measurements are in centimetres except weight which is in kilograms.

From the results in Tables 7.4 and 7.5, there are strong correlations among chest, bust, under bust, waist, lower and upper hips, thigh, upper arm girths and weight. Winks (1997) explained the importance of correlation of body parts in the manufacture of body fitting clothes which may involve two or more control dimensions.

7.5 Selection of Key Dimensions

Control or key dimensions are body measurements on which a sizing system is built and are used to represent a garment size (Winks, 1997; Beazley, 1998). Kemsley (1957) emphasise the importance of translating raw data of body measurements into useful data

through statistical analyses for key dimensions. He suggests that from the mean and correlations, the key dimensions can be determined. These procedures have been utilised in previous studies to develop new size charts or standards (Beazley, 1998; Otieno, 1999; Otieno and Fairhurst, 2000 and Gupta and Gangadhar, 2004). O'Brien and Sheldon (1941) defined key dimensions as a group of body measurements that are closely related to other measurements.

The criteria for the selection of key dimensions have been suggested by different authors. Winks (1997) propose the need for primary, secondary and tertiary control dimensions which should be measured on the individual to be fitted. According to Robinette (1986) key dimension is a body dimension with strong correlation with other body measurements that are important to a garment and Yoon and Jasper (1996) are also of the view that key dimensions are a good predictor of size for other body parts. McConville et al. (1979) suggested that, the selected key dimensions must satisfy certain criteria as they must: be convenient to measure, be an integral part of a garment, have a high degree of correlation with other measurements and be highly correlated with each other. The correlation co-efficient of the selected key dimensions and their relationship with other dimensions are presented in Table 7.6.

Table 7.6: Correlation Co-efficient of key Dimensions and their relationships with other dimensions

Body Dimensions	Bust Girth	Waist Girth	Lower Hip Girth	Height
Bust girth	1	**.904**	**.824**	.151
Waist girth	**.904**	1	**.813**	.102
Lower Hip girth	**.824**	**.813**	1	.174
Height of subjects	.151	.102	.174	1
Neck girth	.706	.690	.644	.276
Shoulder width	.489	.467	.454	.268
Shoulder length	.252	.207	.240	.203
Across chest	.727	**.760**	.648	.193
Chest girth	**.931**	**.907**	**.829**	.169
Across back	.749	.736	.669	.215
Under bust	**.902**	**.915**	**.793**	.161
Upper hip girth	**.877**	**.881**	**.891**	.135
Thigh girth	.748	.722	**.855**	.152
Front waist length	.706	.655	.600	.302
7th cervical to waist	.386	.395	.371	.420
Upper arm girth	**.841**	**.860**	**.830**	.048
Wrist girth	.681	.686	.692	.222
Shoulder to wrist bone	.345	.346	.353	.605
Side waist to knee	.186	.158	.264	.468
Side waist to ankle	.132	.084	.171	**.758**
Weight	**.899**	**.897**	**.911**	.297

N = 600

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

(Strong correlations are highlighted)

Based on the above data four key dimensions (height, bust, waist, and lower hip girths) were selected for the current study. The results in Table 7.6 indicated that, the bust, waist and lower hip girths exhibited strong correlation with other related body dimensions and therefore could be used as key dimensions. It was also observed that, there was poor or no correlation between the girth and length measurements which supports similar findings (Gupta and Gangadhar, 2004; Beazley, 1998 and Kemsley, 1957). Gupta and Gangadhar (2004) observed that girth measurements tend to correlate well with each other and in the same way linear or vertical measurements tend to correlate well with each other. These authors further observed that, there is little or no correlation between the girth and vertical measurements.

The bust was selected as a key dimension as it showed strong correlation to seven other dimensions (McConville et al., 1979) and mild correlation to six body dimensions. The waist girth showed eight strong correlations to other dimensions and five mild

correlations and lower hip showed eight strong correlation to other dimensions and five mild correlations. The height however showed mild correlation to the shoulder to the wrist bone (.605) and side waist to ankle (.758) but was selected as a key dimension as it is a main determinant for garment lengths; and has been selected in previous surveys (Gupta and Gangadhar, 2004, Beazley, 1998 and Kemsley, 1957). This falls in line with ISO 3637:1977 recommendations that, the bust girth, hip girth and height be used as key dimensions for whole body garments. Different key dimensions may however be used or selected for different garment types such as the bust girth for upper body garments, waist and hip girths for lower body garments and height, waist, bust and hip girths for whole body garments for example full length dresses.

7.6 Development of Size Chart from Raw Data

The development of the size chart involved turning the raw data into a size chart by using the results of the descriptive statistics in the form of the mean, median, mode, standard deviation, minimum and maximum values of each body dimension of the 600 women. The process also involved the development of intersize intervals for the various sizes. The size chart developed in this study was for the average figure and height and the extremes are outside the scope of this study. Two size charts were developed in the study as a result of the wide intersize intervals identified in the first chart presented in Table 7.7 which followed the mathematical approach described in Section 7.7.1. In order to reduce the wide intersize intervals a modified size chart was developed and presented in Table 7.8 using Beazley's approach described in Section 7.7.3. However in order to make the size chart also useful for the heights that are considered as the extremes or outliers in this study and not covered in Table 7.8, adjustments were made to the height as presented in Table 7.19.

The process of developing any size chart is based on anthropometric data of the target population. Winks (1997) and Beazley (1998) suggest that, in developing a sizing system three main aspects should be considered, namely:

1. The relationship (correlation) between one dimension and another;
2. The size of intervals by which one garment is larger than the next smaller garment;
3. How to identify the size.

To develop a size chart for this study, the mean, median, mode, standard deviation, minimum and maximum values of each body dimension of the 600 women were utilised

as presented in Table 7.2. According to Winks (1997) the arithmetic mean of a given set of measurements is mostly used which gives an indication of the central tendency which has been utilised in previous studies (Gupta and Gangadhar, 2004; Otieno and Fairhurst, 2000; Otieno, 1999; Beazley, 1998). Size steps were developed by adding and subtracting the standard deviations from the means of all dimensions. To determine a size step, the mean was identified and then increased or decreased by the standard deviation. However, the mean -2 ½ SD and +2 ½ SD were identified in order to determine the upper and lower limits for the size range.

Table 7.7 First Size Chart for 600 subjects

Body Dimensions	- Outliers	-2 ½ SD	-2 SD	-1 SD	Mean	+1 SD	+2 SD	+2 ½ SD	SD	+ Outliers
Weight	0	29	36	51	66	81	96	103	15	
Height	4	143	146	152	158	164	170	173	6	3
Neck Girth	2	28	29	31	33	35	37	38	2	18
Shoulder Width	4	34	35	37	39	41	43	44	2	19
Shoulder Length	4	11	11.5	12.5	13.5	14.5	15.5	16	1	25
Across Chest	0	26	27.5	30.5	33.5	36.5	39.5	41	3	10
Chest Girth	0	68	72	80	88	96	104	108	8	25
Across Back	1	29	30.5	33.5	36.5	39.5	42.5	44	3	18
Bust Girth	1	67	72	82	92	102	112	117	10	21
Under Bust	0	58	62	70	78	86	94	98	8	18
Waist Girth	0	50.5	56	67	78	89	100	105.5	11	24
Lower Hip Girth	1	73.5	79	90	101	112	123	128.5	11	13
Upper Hip Girth	0	63.5	69	80	91	102	113	118.5	11	31
Thigh Girth	4	40	44	52	60	68	76	80	8	14
Front Waist Length	2	33	34.5	37.5	40.5	43.5	48.5	50	3	3
7^{th} Cervical to Waist	7	33	34	36	38	40	42	43	2	15
Upper Arm Girth	1	18	20.5	25.5	30.5	35.5	40.5	43	5	13
Wrist Girth	5	13.5	14	15	16	17	18	18.5	1	20
Acromion to Wrist	6	53	54.5	57.5	60.5	63.5	66.5	68	3	14
Side waist to Knee	6	48.5	50.5	54.5	58.5	62.5	66.5	68.5	4	3
Side waist to Ankle	7	88.5	90.5	95	99.5	104	109.5	111.5	4.5	6

n = 600

Table 7.7 illustrates how the size steps were determined in this study; the waist girth was used as an example. The waist girth had a mean of 78cm and a standard deviation of 11cm. In order to increase the size step from the mean one standard deviation (+1SD), 11cm was added to the mean of 78cm and the result was 89cm and when two standard deviation (2 SD) was added to the mean the result was 100cm. To determine the upper limit for the waist girth, two and a half standard deviation (2 ½ SD) was added to the mean which resulted in 105.5cm. In the same manner, to determine size steps below the mean, one standard deviation (-1 SD), 11cm was deducted from the mean of 78cm and the result was 67cm and when two standard deviation (-2 SD) was deducted from the mean 78cm the result was 56cm. To determine the lower limit for the waist girth, two and a half standard deviation (-2 ½ SD) was deducted from the mean which resulted in 50.5cm. To conclude the example, the waist girth has five size steps with the upper and lower limits of coverage for this dimension therefore

measurements beyond these limits were considered as outliers. The number of outliers for each body dimension is also presented in Table 7.7.

7.6.1 Determining Size Ranges from Raw Data

A size range is defined as the extent of coverage of a scale as defined by its extreme values (Winks, 1997) and to determine a size range involves identifying outliers. For a size chart, outliers are defined as values outside the + and – standard deviation points of the designated size ranges. For the purpose of this study, values beyond the five steps identified are considered as outliers and these are values beyond -2std dev and +2 SD points. This removed the extreme measurements which can cause distortion (Beazley, 1998) and helped to improve the accuracy of the size charts (Gupta and Gangadhar, 2004).

In anthropometric surveys, there are normally certain outliers as the size chart may not be able to cover the extreme ends of all the population. Winks (1997) suggest that extreme values in each range may be excluded to make the range manageable. Winks (1997) further suggest that, in order to achieve acceptably good fit of ready-to-wear clothes, a manufacturer may cater for 80 percent of the surveyed population with 10 percent of the extremes on both sides not catered for. He further explained that the data of the extremes are often unreliable and do not represent majority of the sample. In a survey conducted by Beazley (1998) 95% of the sample was covered with the extreme measurements removed in order to avoid distortion. Beazley (1998) explained that defining size ranges and intervals may not totally be a statistical issue but could be a marketing strategy.

7.7 Inter-size Intervals

The selection of inter-size intervals relate to the considerations of 'interval of indifference'. The interval of indifference is the interval between sizes along certain dimensions that does not make a difference to the wearer (Petrova, 2007). Data was analysed in order to develop a size chart using three different methods

7.7.1 Mathematical Approach

It can be seen from the results presented in Table 7.7 that there is a wide variation between the size steps utilised for the various body dimensions (see SD column). The

mathematical approach of utilising the standard deviation as the size step resulted in wide inter-size intervals which was not practicable in terms of garment sizing and fit. In of the intersize intervals of the key dimensions compared to those of other countries stated in Winks (1997) it was observed that the size steps ranged from 4cm-6cm for countries such UK, France, Portugal, Hungary, Australia and Canada among others. Therefore, it can be concluded that the method of using the standard deviation in determining the size step is not appropriate for the current study in practical terms of informing garments that are intended to fit the human form.

Further to this the size step (standard deviations) for the bust girth was 10cm, the waist girth 11cm and the lower hip girth 11cm respectively. Therefore, the results illustrate that for the smallest size limits for the bust, waist and hip girths would be 72cm, 56cm and 79cm which extended the range beyond the measurements found in this study. Although this method of utilising the mean and standard deviations as the size steps was used successfully in previous studies (Vronti, 2005; Otieno, 1999), the large standard deviations from the current study made it unsuitable to use for the key dimensions and its related measurements. According to Petrova (2007), the interval of indifference depends on several factors as body dimensions such as the hip girth with larger absolute values will have larger intervals of indifference than a smaller dimension such as the wrist girth.

7.7.2 Two Size Charts Approach

The second method of analysing data to be employed was originally used by Mlauli (2003). This involved splitting the data set into two groups using the hip as a guiding point. To achieve this, hip measurements below or equal to 100cm ($\leq$ 100) were considered as average and hip measurements above 100cm ($>$ 100) were considered as large. The hip was selected as a guiding point because in the Ghanaian culture (Antuban, cited in Roach and Eicher, 1973); the hip is emphasized as an area of physical attractiveness and fertility hence most traditional dresses are made to emphasize the hip. By dividing the sample into two, 299 subjects had hip measurements below or equal to 100cm and were known as the Average (AV) and 301 subjects had hip measurements above 100cm and were labelled as large (L). Descriptive statistics in terms of the mode, mean, median, standard deviation, range and percentiles were calculated for the two groups as a first step to develop a body chart.

The arithmetic mean and the standard deviations were utilised in the development of the body measurement charts as discussed in Section 7.6. The data was normalised with size ranges of two standard deviations on each side of the mean. However -21½ and +21½ standard deviations were calculated to determine the upper and lower limits for the size steps. Refer to appendix 7 for the body chart for the two groups.
With this approach, a reasonable standard deviation or size steps were identified for the key dimensions of the average (AV) body size however; the standard deviations especially for the key dimensions for the large size (L) were still not practicable.

In previous studies (Mlauli, 2003) using this approach certain limitations were identified with the two size charts developed from this approach. Due to the fact that the sizes were based around the lower hip girths and not the total body shapes, there were confusion regarding the body shape classification which is central to the development of size charts. In addition, since there has never been a national anthropometric survey conducted in Ghana, it is assumed that the development of this size chart could be used as a foundation on which others should be based and therefore requires easier interpretation in terms of usage. Finally, for the purpose of this study which focuses on the development of a sizing system for the mass customisation of a traditional dress, a single size chart is required which could be easily adapted to suit the body dimensions of the individual consumers for the purpose of garment production.

7.7.3 Beazley Approach to Data Analysis

The third method of analysing data to be used was originally used by Beazley (1998). As a result of the unrealistic size steps illustrated in Table 7.7 the data were normalised by determining the range from the 5^{th} to the 95^{th} percentiles for all the body dimensions to remove extreme outliers which could distort the size range. The resulting data was divided into seven sizes and used as the size step which resulted in a reasonable size step of 5cm for all the key dimensions. The results of the modified size step for the key dimensions were adopted for the current study and are presented in Table 7.8.

Table 7.8: Modified Size Chart for 600 women

Body Dimensions	- Outliers	-2 ½ std	-2 std	-1 std	Mean	+1 std	+2 std	+2 ½ std	Size Step	+ Outliers	% Outliers
Weight	43	48.5	52	59	66	73	80	83.5	7	78	20.1
Height	66	150.5	152	155	158	161	164	165.5	3	68	22.3
Neck Girth	24	30.5	31	32	33	34	35	35.5	1	79	17.1
Shoulder Width	86	36.5	37	38	39	40	41	41.5	1	88	29.0
Shoulder Length	39	12	12.5	13	13.5	14	14.5	15	0.5	55	15.5
Across Chest	42	30	30.5	32	33.5	35	36.5	37	1.5	69	18.5
Chest Girth	51	78	80	84	88	92	96	98	4	80	21.8
Across Back	61	33	33.5	35	36.5	38	39.5	40	1.5	78	23.1
Bust Girth	40	79	82	87	92	97	102	105	5	65	17.5
Under Bust	75	68	70	74	78	82	86	88	4	10	14.1
Waist Girth	58	65	68	73	78	83	88	91	5	91	24.8
Lower Hip Girth	29	88	91	96	101	106	111	114	5	84	18.8
Upper Hip Girth	69	78.5	81	86	91	96	101	104	5	96	27.5
Thigh Girth	46	50	52	56	60	64	68	70	4	55	16.8
Front Waist Length	70	37	37.5	39	40.5	42	43.5	44	1.5	83	25.5
7th Cervical to Waist	87	35.5	36	37	38	39	40	40.5	1	84	28.5
Upper Arm Girth	95	26	27	29	31	33	35	36	2	87	30.3
Wrist Girth	67	14.5	15	15.5	16	16.5	17	17.5	0.5	50	27.5
Acromion to Wrist	71	57	58	59.5	61	62.5	64	65	1.5	52	20.5
Side waist to Knee	54	54	55	57	59	61	63	64	2	40	15.6
Side waist to Ankle	85	95	96	98	100	102	104	105	2	67	25.3

n = 600

Measurements are in centimetres except weight which is in kilograms.

From Table 7.8, the key dimensions (bust, waist and lower hip girths) resulted in the same size step of 5cm. Beazley (1998) adopted the same procedure when the sizes extended beyond the range of her key dimensions and maintained the same interval in which she had a size interval of 4cm. Although Beazley (1998) did not state whether the related dimensions were also adjusted it appeared from her resulting size chart this was the case as the key dimensions and related measurements had the same size step of 4 cm with the exception of the thigh girth which had an interval of 2cm.

However, it was observed that the modified size steps for the all the dimensions resulted in producing more outliers (Table 7.8) as a result of the of the reduction in the range,

although it made the size steps more practical for garment sizing and fit which is an important aspect of every size chart.

In order to reduce the number of outliers an additional size (+3 SD) was created. Although the numbers of outliers on both sides of the mean were similar the key dimensions were used to determine the size to be created which resulted in the addition of a larger size which is presented in Table 7.9. The results indicated that, the developed size chart caters for about 80 percent of the total population surveyed in this study. This concur to Winks (1997) explanation that, in order to achieve acceptably good fit of ready-to-wear clothes and make a range manageable, a manufacturer may cater for 80th percentile of the surveyed population with the extremes on both sides not catered for. Table 7.9 was therefore adopted as the final body chart for the current study and included the six size ranges.

Table 7.9: The Expanded Size Chart with Percentage Outliers

Body Dimensions	-2 ½ SD	-2 std	-1 std	Mean	+1 std	+2 std	+3 SD	+3 ½ SD	Size Step	% Outliers
Weight	48.5	52	59	66	73	80	87	90.5	7	14.0
Height	150.5	152	155	158	161	164	167	168.5	3	17.3
Neck Girth	30.5	31	32	33	34	35	36	36.5	1	16.2
Shoulder Width	36.5	37	38	39	40	41	42	42.5	1	23.0
Shoulder Length	12	12.5	13	13.5	14	14.5	15	15.5	0.5	15.2
Across Chest	30	30.5	32	33.5	35	36.5	38	39	1.5	13.0
Chest Girth	78	80	84	88	92	96	100	102	4	14.4
Across Back	33	33.5	35	36.5	38	39.5	41	42	1.5	18.8
Bust Girth	79	82	87	92	97	102	107	110	5	12.2
Under Bust	68	70	74	78	82	86	90	92	4	12.4
Waist Girth	65	68	73	78	83	88	93	96	5	19.5
Lower Hip Girth	88	91	96	101	106	111	116	119	5	17.5
Upper Hip Girth	78.5	81	86	91	96	101	106	109	5	20.0
Thigh Girth	50	52	56	60	64	68	72	74	4	14.0
Front Waist Length	37	37.5	39	40.5	42	43.5	45	46	1.5	19.9
7th Cervical to Waist	35.5	36	37	38	39	40	41	41.5	1	18.1
Upper Arm Girth	26	27	29	31	33	35	37	38	2	25.7
Wrist Girth	14.5	15	15.5	16	16.5	17	17.5	18	0.5	24.6
Acromion to Wrist	57	58	59.5	61	62.5	64	65.5	66	1.5	18.9
Side waist to Knee	54	55	57	59	61	63	65	66	2	12.7
Side waist to Ankle	95	96	98	100	102	104	106	107	2	23.2

n = 600

The coverage of the size range of the key dimensions (bust, waist and lower hip girths) is shown in Figure 7.1 to 7.3 and it can be observed that only the hip girth represents a normal distribution of the sample size.

Figure 7.1: Distribution Curve for the Bust Girth

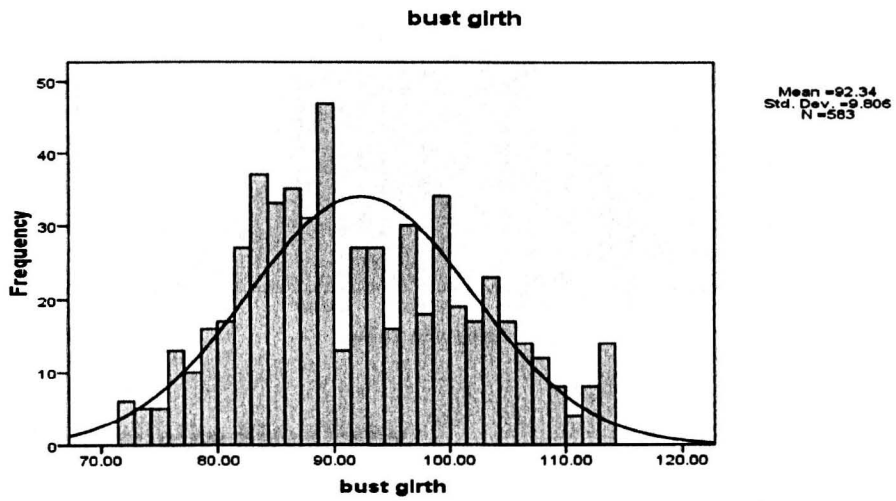


Figure 7.2: Distribution Curve for the Waist Girth

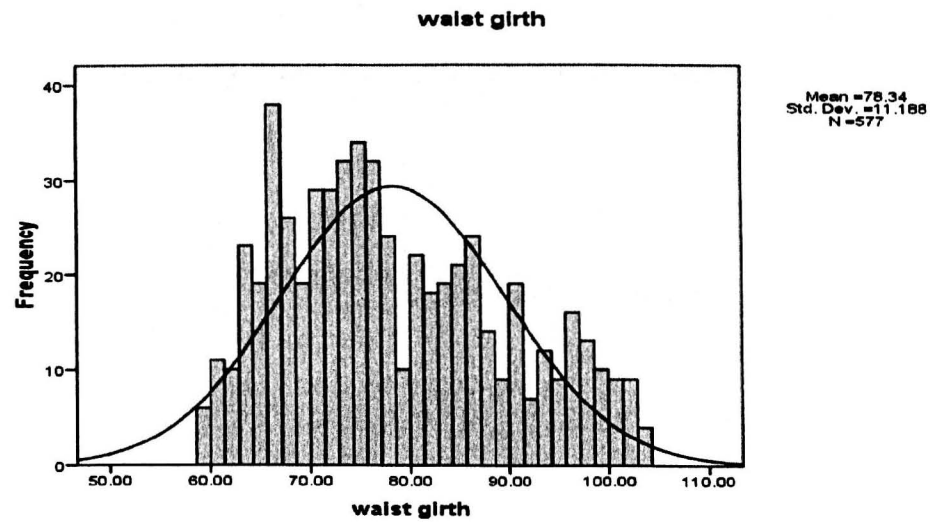
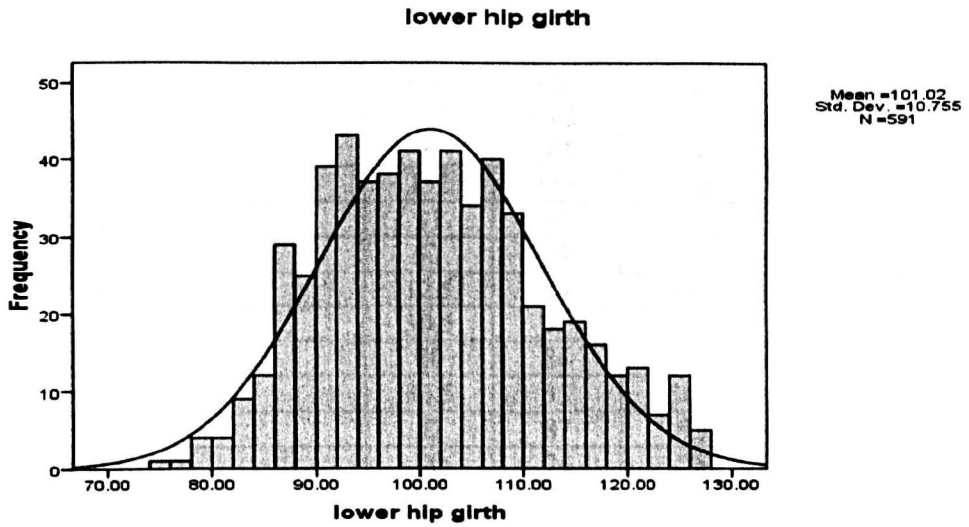


Figure 7.3: Distribution Curve for the Lower Hip Girth



7.8 Determining Size Codes

In developing size codes, the mean is used as the equivalent of size 12 as in the UK garment industry or the average size, mean +1 standard deviation is the equivalent of size 14, mean +2 standard deviations is equivalent to size 16 and mean +3 standard deviations is equivalent to size 18. Also mean -1 standard deviation is equivalent to size 10, mean -2standard deviation is equivalent to size 8. The size codes GH 8, GH 10, GH 12, GH 14, GH 16 and GH 18 referring to Ghanaian sizes are thus discerned as size codes for this study. Previous researchers have utilised this process in determining size codes (Vronti, 2005). Table 7.10 represents the size codes discerned for this study.

Table 7.10: Size Steps and Size Codes

Body Dimensions	Mean -2 std Size GH 8	Mean -1 std Size GH 10	Mean Size GH 12	Mean +1 std Size GH 14	Mean +2 std Size GH 16	Mean +3 std Size GH 18
Height	152	155	158	161	164	167
Neck Girth	31	32	33	34	35	36
Shoulder Width	37	38	39	40	41	42
Shoulder Length	12.5	13	13.5	14	14.5	15
Across Chest	30.5	32	33.5	35	36.5	38
Chest Girth	80	84	88	92	96	100
Across Back	33.5	35	36.5	38	39.5	41
Bust Girth	82	87	92	97	102	107
Under Bust	70	74	78	82	86	90
Waist Girth	68	73	78	83	88	93
Lower Hip Girth	91	96	101	106	111	116
Upper Hip Girth	81	86	91	96	101	106
Thigh Girth	52	56	60	64	68	72
Front Waist Length	37.5	39	40.5	42	43.5	45
7^{th} Cervical to Waist	36	37	38	39	40	41
Upper Arm Girth	27	29	31	33	35	37
Wrist Girth	15	15.5	16	16.5	17	17.5
Acromion to Wrist	58	59.5	61	62.5	64	65.5
Side waist to Knee	55	57	59	61	63	65
Side waist to Ankle	96	98	100	102	104	106

(Measurements are in centimetres)

The mean represents size 12, which is normally used when drafting or grading patterns in the UK garment industry and Euro size 40 and American size 10. The intervals at mean +1std dev. represent size 14; the intervals at mean +2std dev. represent size 16. The intervals at mean -1std dev represent size 10 and mean -2std dev represent size 8. For the purpose of this study which is the first to investigate a sizing system for Ghanaian women only body sizes GH8 to GH18 were identified which has coverage of 80%.

7.8.1 Comparison of Current Size Chart with Others

Intersize intervals are crucial in determining the range covered be a particular dimension. Earlier on in Table 7.7, it was observed that the intersize intervals of the size range were too wide for garment fit and practicality. As a result, Beazley's (1998) approach in garment sizing was adopted which reduced the variability of the intersize intervals among the body dimensions as presented in Table 7.8. It is evident from the findings in Table 7.11 that, the intersize intervals of the current study compares

favourably with other size charts (Beazley, 1998; Gupta and Gangadhar, 2004: Aldrich, 2004; Winks, 1997 and Zwane and Magagula, 2007). Although the BS EN (BS EN 13402-3, 2004) standards recommends an intersize interval of 4cm as a guideline among the key dimensions (bust, waist, hip) girths, the current study does not deviate too much from these standards. This may be attributed to the fact that the average measurements of the key dimensions found in this study are larger than the average size of other studies charts (Beazley, 1998; Gupta and Gangadhar, 2004: Aldrich, 2004; Winks, 1997 and Zwane and Magagula, 2007) which makes the average Ghanaian woman larger than the average European woman.

However, the intersize intervals of the key dimensions, compares favourably with those found in Gupta and Gangadhar (2004) study in India and also compares with existing international size charts (Winks, 1997) which ranged from 4cm to 6cm among the various countries therefore 5cm found in the current study is acceptable with regards to garment manufacture and fit.

Table 7.11: Comparison of Intersize Intervals

Body Dimensions	Other Studies							
	BS EN Standards	Beazley (study) (1997)	Gupta& Gangadhar (2004)	Swaziland(size chart) (2007)	South Africa (2007)	UK (size chart) (1997)	Aldrich (2004)	Ghana (current Study)
Height	-	-	2.5	-	-	-	-	3
Neck Girth	-	1	1.2	-	-	-	1	1
Shoulder Width	-	0.5	1.2	-	-	-	-	1
Shoulder Length	-	1	1.2	-	-	-	0.25	0.5
Across Chest	-	1	-	-	-	-	1.2	1.5
Chest Girth	-	4	-	-	-	-	-	4
Across Back	-	1	-	-	-	-	1	1.5
Bust Girth	4&6	4	5	4&5	4&5	4&5	4	5
Under Bust	-	-	-	-	-	-	-	4
Waist Girth	4&6	4	5	4	4	4	4	5
Lower Hip Girth	4&5	4	5	4&5	4&5	4&5	4	5
Upper Hip Girth	-	4	-	-	-	-	-	5
Thigh Girth	-	2	5.5	-	-	-	-	4
Front Waist Length	-	0.5	0.5	-	-	-	0.5	1.5
7^{th} Cervical to Waist	-	0.5	-	-	-	-	0.5	1
Upper Arm Girth	-	1	2.5	-	-	-	1.4	2
Wrist Girth	-	0.5	0.5	-	-	-	0.5	0.5
Acromion to Wrist	-	0.5	-	-	-	-	0.5	1.5
Side waist to Knee	-	0	-	-	-	-	0.5	2
Side waist to Ankle	-	0	1.2	-	-	-	0.5	2

(Measurements in centimetres)

In comparing the actual measurements of the key dimensions in the current study in Table 7.12 with those found in literature (Beazley, 1998; Gupta and Gangadhar, 2004: Aldrich, 2004; Winks, 1997 and Zwane and Magagula, 2007), the findings indicated that the average measurements in this study are larger and compares to one size above the average (UK, 12). However, the measurements of the key dimensions in this study are similar to those found by Vronti (2005) in her study on Cyprus women. The size drop is defined as the difference between the bust and hip girths (Winks, 1997; Chun-Yoon and Jasper, 1993) for women, it is important in determining the body shape of an individual. According to Yu (2004a) the size drop for the average women varies from 2.5 to 8cm based on the size chart of different countries. A comparison of the drop value of the current study with others is presented in Table 7.12 indicated that Beazley (1997) and Gupta and Gangadhar (2004) had the highest drop of 10cm and the lowest of

5cm was identified in Swazi size 36 (Zwane and Magagula, 2007) and the average of size UK (Bougourd, 2004). The current study however has a drop value of 9cm and compares with Vronti (2005) study on Cyprus women. It is therefore reasonable to conclude that the key dimensions of the current study are similar to those found among Cyprus subjects by Vronti (2005).

Table 7.12: Comparison of Key Dimensions

Body Dimensions	Other Studies							
	Size UK (Average)	Beazley Size 12	Gupta& Gangadhar Size 12	Swaziland Size 36	Vronti Size 12	UK Size 12	Aldrich Size 12	Current study 12
Height	163	165	156	-	159	160	-	158
Bust Girth	98	88	86	88	91	88	88	92
Waist Girth	86	68	76	68	79	70	70	78
Lower Hip Girth	103	96	96	93	100	94	94	101
Drop	5	10	10	5	9	6	6	9

(Measurements in centimetres)

7.9 Determining Lower and Upper Limits

The upper and lower limits denote the extent of coverage for inter-size ranges and these are established for each body dimension which is presented in Table 7.13. All measurements are in centimetres. In order to determine the upper and lower limits, first half of every size step was calculated for each body dimension. Next add or subtract ½ of the size step from each measurement and select a point 0.01 above or below the figure. For example, the mean value (size GH 12) for the height is 158cm and the size step is 3cm, therefore ½ of the size step is 1.5cm. If 1.5cm is subtracted from 158cm, the result is 156.50cm and if 1.5cm is added to 158cm, the result is 159.49cm. Therefore, the lower limit is 156.50cm and the upper limit 159.50cm but in order that the upper limit does not overlap with the next size 0.01 is thus subtracted from 159.50cm making it 159.49cm. This procedure has been utilised by other researchers (Beazley, 1998; Otieno, 1999; Otieno and Fairhurst, 2000, Mluali, 2003).

Table 7.13 : Upper and Lower Limits for Each Size and Body Dimension

Body Dimensions	Size GH8	Size GH10	Size GH12	Size GH14	Size GH16	Size GH18
Height	150.5	153.50	156.50	159.50	162.50	165.50
	152.00	**155.00**	**158.00**	**161.00**	**164.00**	**167.00**
	153.49	156.49	159.49	162.49	165.49	168.49
Neck Girth	30.50	31.50	32.50	33.50	34.50	35.50
	31.00	**32.00**	**33.00**	**34.00**	**35.00**	**36.00**
	31.49	32.49	33.49	34.49	35.49	36.49
Shoulder Width	36.50	37.50	38.50	39.50	40.50	41.50
	37.00	**38.00**	**39.00**	**40.00**	**41.00**	**42.00**
	37.49	38.49	39.49	40.49	41.49	42.49
Shoulder Length	12.25	12.75	13.25	13.75	14.25	14.75
	12.50	**13.00**	**13.50**	**14.00**	**14.50**	**15.00**
	12.74	13.24	13.74	14.24	14.74	15.24
Across Chest	29.75	31.25	32.75	34.25	35.75	37.25
	30.50	**32.00**	**33.50**	**35.00**	**36.50**	**38.00**
	31.24	32.74	34.24	35.74	37.24	38.74
Chest Girth	78.00	82.00	86.00	90.00	94.00	98.00
	80.00	**84.00**	**88.00**	**92.00**	**96.00**	**100.00**
	81.99	85.99	89.99	93.99	97.99	101.99
Across Back	32.75	34.25	35.75	37.25	38.75	40.25
	33.50	**35.00**	**36.50**	**38.00**	**39.50**	**41.00**
	34.24	35.74	37.24	38.74	40.24	41.74
Bust Girth	79.50	84.50	89.50	94.50	99.50	104.50
	82.00	**87.00**	**92.00**	**97.00**	**102.00**	**107.00**
	84.49	89.49	94.49	99.49	104.49	109.49
Under Bust	68.00	72.00	76.00	80.00	84.00	88.00
	70.00	**74.00**	**78.00**	**82.00**	**86.00**	**90.00**
	71.99	75.99	79.99	83.99	87.99	91.99
Waist Girth	65.50	70.49	75.50	80.50	85.50	90.50
	68.00	**73.00**	**78.00**	**83.00**	**88.00**	**93.00**
	70.49	75.49	80.49	85.49	90.49	95.49
Lower Hip Girth	88.50	93.50	98.50	103.50	108.50	113.50
	91.00	**96.00**	**101.00**	**106.00**	**111.00**	**116.00**
	93.49	98.49	103.49	108.49	113.49	118.49
Upper Hip Girth	78.50	83.50	88.50	93.50	98.50	103.50
	81.00	**86.00**	**91.00**	**96.00**	**101.00**	**106.00**
	83.49	88.49	93.49	98.49	103.49	108.49
Thigh Girth	50.00	54.00	58.00	62.00	66.00	70.00
	52.00	**56.00**	**60.00**	**64.00**	**68.00**	**72.00**
	53.99	57.99	61.99	65.99	69.99	73.99
Front Waist Length	36.75	38.25	39.75	41.25	42.75	44.25
	37.50	**39.00**	**40.50**	**42.00**	**43.50**	**45.00**
	38.24	39.74	41.24	42.74	44.24	45.74
7^{th} Cervical to Waist	35.50	36.50	37.50	38.50	39.50	40.50
	36.00	**37.00**	**38.00**	**39.00**	**40.00**	**41.00**
	36.49	37.49	38.49	39.49	40.49	41.49
Upper Arm Girth	26.00	28.00	30.00	32.00	34.00	36.00
	27.00	**29.00**	**31.00**	**33.00**	**35.00**	**37.00**
	27.99	29.99	31.99	33.99	35.99	37.99
Wrist Girth	14.75	15.25	15.75	16.25	16.75	17.25
	15.00	**15.50**	**16.00**	**16.50**	**17.00**	**17.50**
	15.24	15.74	16.24	16.74	17.24	17.74
Acromion to Wrist	57.25	58.75	60.25	61.75	63.25	64.75

	58.00	**59.50**	**61.00**	**62.50**	**64.00**	**65.50**
	58.74	60.24	61.74	63.24	64.74	66.24
Side waist to Knee	54.00	56.00	58.00	60.00	62.00	64.00
	55.00	**57.00**	**59.00**	**61.00**	**63.00**	**65.00**
	55.99	57.99	59.99	61.99	63.99	65.99
Side waist to Ankle	95.00	97.00	99.00	101.00	103.00	105.00
	96.00	**98.00**	**100.00**	**102.00**	**104.00**	**106.00**
	96.99	98.99	100.99	102.99	104.99	106.99

(Actual size measurements are highlighted)

7.9.1 Size Chart Coverage

The frequencies of distribution of each measurement of the various sizes are presented in Table 7.14 which suggests that about 80 percent of the sample size is covered by the developed size chart. The key dimensions on which size charts are based have percentage coverage of bust girth (87.8), waist girth (80.5), lower hip girth (82.5) and the height (82.7). According to Winks (1997) the extent of the actual coverage of a size chart depends on the type of garment, the degree of fit and the variation of body shape among the population. Petrova (2007) is however of the view that the coverage rate for a typical size chart may be between 65 to 85 percent depending on the garment type. The current study therefore compares favourably with the suggestions of the above author.

Table 7.14: Body Measurements Frequency

Body Dimensions	**Size GH 8**	**Size GH 10**	**Size GH 12**	**Size GH 14**	**Size GH 16**	**Size GH 18**	**Total**	**Percentage Coverage**
Height	56	108	121	109	71	30	495	82.7
Neck Girth	89	96	99	84	72	53	493	83.8
Shoulder Width	63	86	89	90	63	54	445	77.0
Shoulder Length	110	115	43	130	28	66	492	84.8
Across Chest	111	102	123	83	71	32	522	87.0
Chest Girth	89	105	105	65	63	61	488	85.6
Across Back	95	69	127	64	92	31	478	81.2
Bust Girth	91	122	97	83	75	44	512	87.8
Under Bust	126	121	100	73	52	34	506	87.6
Waist Girth	113	110	68	77	61	36	465	80.5
Lower Hip Girth	102	94	102	99	52	39	488	82.5
Upper Hip Girth	58	154	78	67	56	51	464	80.0
Thigh Girth	81	121	106	78	90	30	506	86.0
Front Waist Length	99	64	144	55	76	33	471	80.1
7^{th} Cervical to Waist	102	96	99	95	46	44	482	81.9
Upper Arm Girth	101	83	80	71	59	49	443	74.3
Wrist Girth	123	56	137	35	74	23	448	75.4
Acromion to Wrist	64	126	75	126	39	49	479	81.1
Side waist to Knee	61	106	118	114	80	40	519	87.3
Side waist to Ankle	62	84	104	91	69	46	456	76.8

7.10 Development of Garment Measurements

The creation of garment measurement chart requires the addition of ease allowances to the various body dimensions (Gupta and Gangadhar, 2004, Beazley, 1998). Garment ease is referred to as the difference between the body and the garment that allows freedom of movement whereas design is refers to as ease added to the garment to create a required visual effect or style (Branson and Nam, 2007). According to Branson and Nam (2007) the amount of ease required in a garment is a difficult issue but important in the evaluation of fit in general. As a result, a close-fitting garment requires less garment ease than a loose-fitting garment. The amount of ease allowance may however, depend on the body location, garment and fabric type and therefore cannot be comparable among manufacturers (Otieno, 2007; Beazley, 1999). The ease allowances adopted for this study were utilised by Beazley (1999) and Vronti (2005) and are presented in Table 7.15.

Table 7.15: Body Measurements and Ease Allowances

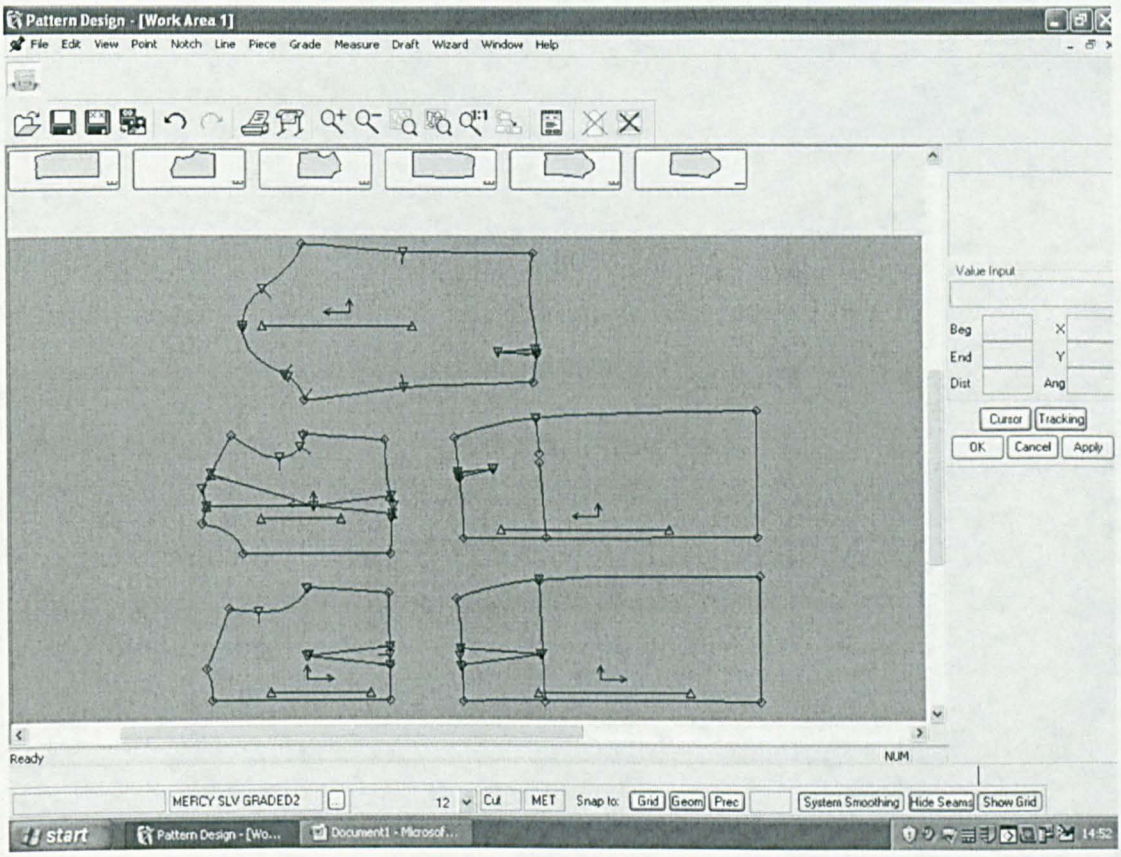
Body Dimensions	Size GH 8	Size GH 10	Size GH 12	Size GH 14	Size GH 16	Size GH 18	Ease Dress	Ease Skirt
Neck Girth	31	32	33	34	35	36	2.0-3.0	
Shoulder Width	37	38	39	40	41	42	-	
Shoulder Length	12.5	13	13.5	14	14.5	15	-	
Across Chest	30.5	32	33.5	35	36.5	38	2.0- 4.0	
Across Back	33.5	35	36.5	38	39.5	41	2.0- 4.0	
Bust Girth	82	87	92	97	102	107	5.0-8.0	
Waist Girth	68	73	78	83	88	93	4.0-5.0	2.0- 4.0
Lower Hip Girth	91	96	101	106	111	116	5.0-6.0	4.0-5.0
Upper Hip Girth	81	86	91	96	101	106	5.0-6.0	4.0-5.0
Front Waist Length	37.5	39	40.5	42	43.5	45	0.5	
7^{th} Cervical to Waist	36	37	38	39	40	41	0.5	
Upper Arm Girth	27	29	31	33	35	37	5.0-6.0	
Wrist Girth	15	15.5	16	16.5	17	17.5	3.0-4.0	
Sleeve length	58	59.5	61	62.5	64	65.5	1.0	

7.10.1 Pattern Configuration

The SPSS (version 12) was used to analyse the anthropometric data through descriptive statistics and correlation tests from which an original size chart was developed (Table 7.10). Pattern construction is an important process in garment production as the anthropometric measurements are turned into basic blocks in order to develop new designs. For the purpose of this study, the basic blocks (front and back bodices, front and back skirts and sleeve) were manually constructed and digitised (Beazley and Bond, 2003) in the System Management of the Gerber technology for the base size (GH 12) of

the developed size chart. The pattern configuration process was an important step in translating manually drafted basic blocks into 2D patterns and checked to verify the accuracy of the patterns which are shown in Figure 7.4.

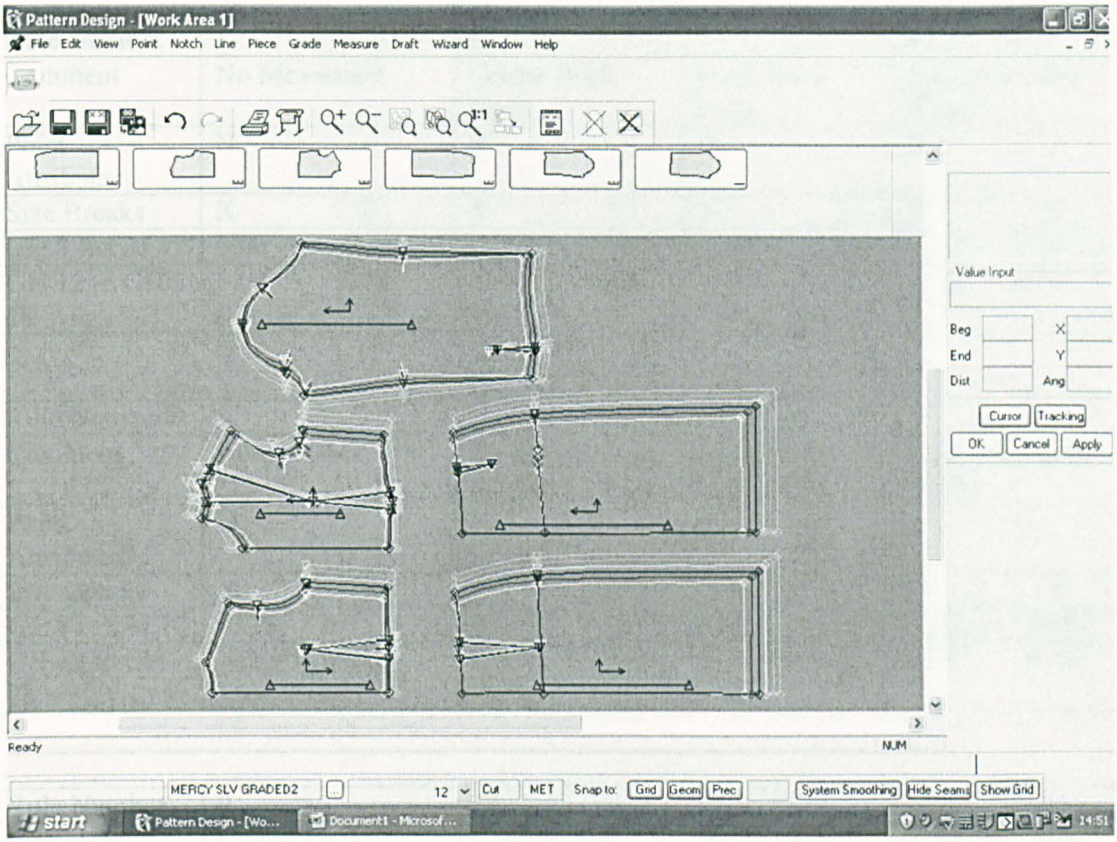
Figure 7.4: Pattern Configuration



7.10.2 Grading of 2D Patterns

Grading is the process of applying increases and decreases at points of a master pattern to make it larger or smaller according to a specified size chart (Schofield and LaBat, 2005; Beazley and Bond, 2003). According to Moore, Mullet and Young, 'A grading system is developed from sizing specifications, and sizing specifications are derived from anthropometric surveys (2001, p. 7). For the purpose of this study, the basic blocks for the base size (GH 12) was graded down two sizes and up three sizes in order to achieve all the sizes developed in the current study utilising the Pattern Design System 2000 software package and presented in Figure 7.5.

Figure 7.5: Graded 2D Patterns



7.10.3 Grading Rule Tables

The grading rules were developed from the based on the proportions of the intersize intervals of each body dimension as presented in Tables 7.16 and 7.17 respectively. These grading rules are proportionately applied to each pattern in order to grade each size based on the suggestions of Beazley and Bond (2003).

Table 7.16: Basic Bodice and Sleeve Blocks

Rule Number	1		2		3		4	
Comment	No Movement		Centre Back Neck		Back Neck Point		Back Shoulder Width	
Point Attributes	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
GH 8 to GH 12	0.00	0.00	-0.50	0.00	-0.50	0.25	-0.50	0.75
GH 12 to GH 18	0.00	0.00	-0.50	0.00	-0.50	0.25	-0.50	0.75

Rule Number	5		6		7		8	
Comment	Across Back		Back Bust Width		Back Waist Width		Back Waist Dart Width	
Point Attributes	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
GH 8 to GH 12	-0.25	0.75	0.00	1.25	0.50	1.25	0.50	0.20
GH 12 to GH 18	-0.25	0.75	0.00	1.25	0.50	1.25	0.50	0.20

Rule Number	9		10		11		12	
Comment	Centre Back Length		Centre Front Length		Front Neck Point		Front Shoulder Dart	
Point Attributes	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
GH 8 to GH 12	0.50	0.00	1.00	0.00	1.00	0.25	1.00	0.20
GH 12 to GH 18	0.50	0.00	1.00	0.00	1.00	0.25	1.00	0.20

Rule Number	13		14		15		16	
Comment	Front Shoulder Width		Across Front		Front Bust Width		Front Waist Width	
Point Attributes	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
GH 8 to GH 12	1.00	0.75	0.50	0.75	0.00	1.25	-0.50	1.25
GH 12 to GH 18	1.00	0.75	0.50	0.75	0.00	1.25	-0.50	1.25

Table 7.16 (Continued)

Rule Number	17		18		19		20	
Comment	Front Waist Dart Width		Centre Front Length		Side Waist		Front Sleeve	
Point Attributes	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
GH 8 to GH 12	-0.50	0.20	-0.50	0.00	-0.50	1.25	0.00	-0.80
GH 12 to GH 18	-0.50	0.20	-0.50	0.00	-0.50	1.25	0.00	-0.80

Rule Number	21		22		23		24	
Comment	Sleeve Crown		Back Sleeve		Back Sleeve Hem		Front Sleeve Hem	
Point Attributes	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
GH 8 to GH 12	0.50	0.00	0.00	0.80	-1.00	0.25	-1.00	-0.25
GH 12 to GH 18	0.50	0.00	0.00	0.80	-1.00	0.25	-1.00	-0.25

Rule Number	25		26		27		28	
Comment	Back Upper Arm Girth		Front Upper Arm Girth		Sleeve Front Mod		Sleeve Back Mod	
Point Attributes	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
GH 8 to GH 12	0.00	-1.00	0.00	1.00	0.00	0.80	0.00	-0.80
GH 12 to GH 18	0.00	-1.00	0.00	1.00	0.00	0.80	0.00	-0.80

Table 7.17: Basic Skirt Blocks

Rule Number	1		2		3		4	
Comment	No Movement		Front/Back Side Waist		Front/Back Side Hip		Back Side Hem	
Point Attributes	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
GH 8 to GH 12	0.00	0.00	0.00	1.25	0.00	1.25	1.50	1.25
GH 12 to GH 18	0.00	0.00	0.00	1.25	0.00	1.25	1.50	1.25

Rule Number	5		6		7		8	
Comment	Centre Front/Back Hem		Front/Back Dart		Centre Front		Front Side Hem	
Point Attributes	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
GH 8 to GH 12	1.50	0.00	0.00	0.20	-1.50	0.00	-1.50	1.25
GH 12 to GH 18	1.50	0.00	0.00	0.20	-1.50	0.00	-1.50	1.25

7.11 Fitting Trials

Fitting trials are an important aspect of the development of size charts as this involves verifying that the garment designed for the specific size dimensions does indeed fit (Le Pechoux and Ghosh, 2002; Pheasant, 1986). There are different methods of establishing fit of prototypes such as the use of dress forms and live models (Le Pechoux and Ghosh, 2002; Bougourd, 2007; Pheasant, 1986) or the calculation of aggregate loss of fit based on a formula (Gupta and Gangadhar, 2004). The ASTM however suggest at least 3-5 subjects should be chosen for the fit of each size category and the sample should be representative of the actual sample for the survey.

Basic garments or prototypes were constructed in calico (non-stretch fabric) for all the six sizes using the graded patterns developed in the study (refer to Section 7.10.2) which is a dress to test the fit for these body areas. Patterns were transferred from paper patterns onto the fabric using the tracing wheel and coloured tracing paper. In order to check the accuracy of the toile's the measurements were cross-checked with those of the paper patterns. For the purpose of this study, live models were used for the fitting trials and seven subjects were selected from each size GH8 to GH18 based on the age group classification of the study. The criteria used for the selection of the subjects were also based on the size of the key dimensions (height, bust, waist and hip) as identified in this study. As a result 42 subjects in all took part in the fitting trials which were conducted in Manchester (See Appendix 8 for the fit assessment sheet).

The sample was recruited through snowball technique from the Ghanaian community living in Manchester as it was not possible for the researcher to go back to Ghana for the fitting trials due to financial as well as time constrains. The subjects were first contacted through telephone calls and were asked whether they were interested in participating in the fitting trials which was needed to validate the size chart developed for Ghanaian women. It was not possible to randomly select the sample for the fitting trials as participation was based on the size of the key dimensions and the willingness of the subjects. As a result the subjects were purposively selected from the various age groups (20-54) years studied in this study so as to have a representative sample as suggested by Pheasant (1986).

The fitting trials took place in the homes of the subjects at times that was convenient to the subjects and lasted for about 30 minutes. Seven subjects from each age group tried on the prototypes and judgements were made by the researcher, however, the subjects were asked for their opinions in terms of comfort. The fitting trials were judged in terms

of the relationship between the size of the garment and the contour of the human body based on the five factors namely ease, line, grain, set and balance according to the views of Chen (2007) as identified in the literature under Section 3.8. As suggested by Le Pechoux and Ghosh (2002) the subjects were observed in standing, seated and walking positions in order to judge the fit of the prototypes based on the five factors listed above. The fitting trials were conducted using data sheets coded as the field work (Appendix 8) as anonymity was assured (See Appendix 9 for photograph of fitting Trials). It was confirmed from the fitting trials that no adjustments were necessary for the modified size chart in Table 7.8 as most of the fit problems experienced were mainly due to figure problems or deviations from the average such as broad and square shoulders, low true bust points, protruding abdomen and large waist lines as presented in Table 7.18. It is against this background that mass customisation is particularly suitable for individuals who deviate from the standard idea figure and size as personal body measurements and fit specifications are used for garment manufacture.

Although the participants' perception of fit in terms comfort was evaluated, the researcher's expert knowledge in fit assessment was paramount in judging the overall fit of the test garments in relation to the five factors identified in the literature. This is because the perception of fit is subjective and depends on the individuals preferences; therefore the expert judgement of fit assessor is important. It was observed that the test garments had adequate ease, proper seam placement, good balance and set and requires no adjustments.

Table 7.18: Fitting Trial Assessments

	Observations		
Body Dimensions	**Good Fit**	**Poor Fit**	**Causes of Poor Fit**
Neckline Position	40	2	Looseness at the neckline making it to gape.
Shoulder Length	37	5	Strain at the shoulder seam position due to broad shoulders.
Shoulder Width	38	4	Strain at the shoulder seam position due to broad shoulders.
Bust Girth	37	5	Strain at the bust position due to low bust level
Across Chest	40	2	Looseness caused by hollow chest
Across back	39	3	Strain due to broad shoulders.
Waist Girth	36	6	Strain caused by protruding stomach
Waist Position	38	4	High waist position
Front Waist Length	38	4	The front waist length was too short
Centre Back Length	40	2	The length too short due to low waist level
Lower Hip Girth	37	5	Folds and strain at the front upper hip position due to protruding abdomen which made the front garment to be shorter than the back
Upper Arm Girth	39	3	Strain at the biceps
Acromion to Wrist	40	2	Sleeves too long
Wrist Girth	42	0	No problems observed
Side Waist to Knee	42	0	No problems observed
Side Waist to Ankle	42	0	No problems observed
Total Subjects	**42**		

7.12 Consumers Perception of Fit

The concept of fit varies as a function of current fashion and fit preference of the individual and involves both physical as well as psychological attributes associated with comfort and satisfaction (Ashdown and O'Connell, 2006). Although fit is considered as subjective, perception of garment fit by the test participants was important to judge the overall comfort of the test garments. Each participant was asked about the perceived fit (looseness or tension) at key areas such as the back width, bust, hip, biceps and the waist in standing, walking and seating positions. It was observed that 36 of the participants did not have fit problems at the bust position; however 6 had tension at the bust due to low true bust points. Similarly, 4 of the participants experienced strain at the back width which was mainly caused by broad and square shoulders. In relation to the lower hip, 5 of the participants observed strain and folds at the upper hip level due to protruding abdomen and 7 participants experienced strain at the waistline due to relatively rounded stomach. Only two of the participants experienced strain at the biceps

which was caused by large upper arm. In general, good relationship was observed between the waist and hip areas which have been identified in the literature as problems mainly affecting the fit of garments for women of black ethnic origins. 38 of the participants found the overall fit of the test garments to be satisfactory and as a result, this study is important in addressing the fit issues of Ghanaian women.

7.13 Height Adjustments

The size chart developed in this study was for the medium height woman, however, in order to make the size chart also useful for the extreme heights that are not covered or outside the scope of this study, that is the short and tall, a linear adjustment was made.
In order to classify the size chart into different heights, the anthropometric data was divided into three groups following Gupta and Gangadhar's approach (2004) as follows:-

1. Short was < Mean – Standard Deviation (SD),
2. Medium was Mean ± SD, and
3. Tall was > Mean + SD.

The results are presented in Table 7.18 which revealed that the majority of the subjects (69.9) percent in this study are concentrated in the medium category with about (15) percent spread in the other categories respectively (refer to Table 7.2 for the mean and standard deviation).

Table 7.19: Height Classification of the Size Chart

Category	Height (cm)	Frequency/Percentage	Maximum	Minimum
Short	<152	86 (14.4)	140	151
Medium	152-164	419 (69.9)	164	152
Tall	>164	94 (15.7)	177	165

It is evident from the fitting trials that the current size chart needs no further adjustment and has therefore been verified to be suitable for garment manufacture. The mean front waist lengths for the short and tall heights were calculated and it is interesting to note that both heights were 1.5cm less than that of the medium or average height. Therefore, in order to cater for the two groups there was the need to reduce the front waist lengths to accommodate the short and the tall height category as presented in Table 6.19.

Table 7.20: Height Adjustments for the Front Waist Length

Variable	Short Height	Medium Height	Tall Height	Size Step
Height	<152	152 - 164	>164	
Front waist length (Mean)	39.0	40.5	42.0	1.5

7.14 Chapter Summary

In this chapter the anthropometric data was critically analysed through statistical tests to develop the of size chart for the mass customisation of the Ghanaian traditional dress. Descriptive statistics was used to analyse the results from the main anthropometric survey from which the average mean was determined as the indication of the central tendency. The multiple correlation tests revealed the strength of relationship among the body dimensions required for the selection of key dimensions (bust, waist, hip girths and height). In order to develop the sizing system for the study, three different methods were explored to determine suitable inter-size intervals. Six sizes (GH8 – GH 18) were developed using Beazley's (1998) approach found to be the most appropriate due to the large standard deviations of the body dimensions found in this study. The evaluation of the size chart revealed that the average measurements of the key dimensions (bust, waist, hip girths) were found to be larger compared to the measurements from other studies and has a total coverage of about 80 percent. This has practical implications in terms of garment manufacture using other size charts for this target group which strengthens the development of size chart specifically for the Ghanaian population (objective 3) if fit issues are to be resolved.

To validate the fit of the developed size chart, the measurements were drafted manually (front and back bodices, front and back skirts and a sleeve) and digitised to verify the accuracy. Grading rule tales were also created based on the proportional inter-size intervals for the basic blocks in size 12 to be graded up and down into the required sizes. Test garments were constructed in each size and fitting trials were conducted.

CHAPTER 8 Discussion of Results

8.1 Introduction

This chapter presents the research findings for the first three objectives (p. 9). The analyses of the research results are explored in order to develop a conceptual framework as outlined in the fourth objective and a model for information flow in relation to mass customisation (objective 5) of the study. The results are discussed under the following main themes and include evaluation of the meaning, evolution and utilisation of traditional dress, mass customisation, the current production methods, the utilisation of anthropometric data and the quality standards. In addition, the development of Ghanaian size chart is contextualised.

8.2 Meaning of Traditional Slit and Kaba

In order to address the first objective of this study which looked at the evaluation of Ghanaian women's attitude towards the traditional dress, the following themes were explored; meaning, evolution and utilisation in relation to mass customisation.

Past research suggests the use of traditional/ethnic dress as a cultural symbol (Hamilton, 1991; Eicher and Sumberg, 1995) which has symbolic meaning (Crane et al, 2004; Damhorst, 2005; Barnard, 2002; Roach-Higgins and Eicher, 1992; Nagasawa, Hutton and Kaiser, 199) and mediates between the individual and culture (Hamilton and Hamilton, 1989). This underlines the views of the Symbolic Interactionists' perspective (Blummer, 1969; Stone, 1962) in relation to understanding the meaning of dress in the social interaction process which Kaiser (2002) later added the basic assumptions to include underlying appearance. According to the Symbolic Interactionists' perspective, individuals acquire identities through social interactions and this perspective is important in the understanding of meaning. Previous researchers have found the relationship between the uses of dress in the communication process of individuals (Eicher, Evenson and Lutz, 2005; Barnard, 2002; Kaiser, 2002; Dogbe, 2003; Salm and Falola, 2002; Davis, 1992, Holman, 1980) and in the establishment of identity. But little research was found that addresses Ghanaian women's attitude towards the traditional dress which is the first objective to be addressed with the exception of (Dogbe, 2003; Salm and Falola, 2002 and Matthews, 1979).

It is evident from the primary research that the traditional dress functions as an important medium for social differentiation in terms of identity construction in Ghana which is communicated through the symbolic meanings of fabrics used for this dress. In terms of the traditional dress, the fabrics are core to its symbolic meaning and utilisation which plays a significant role in its classification as a traditional dress. The symbolic meaning of fabric usage is emphasised in this research and signifies the important role of fabrics in defining the underlying meanings of the traditional dress. The findings from this research further suggest that the meanings attached to the definition of the traditional dress by the participants are socio-cultural and include heritage, national identity, respect, admiration and sense of belonging to the Ghanaian culture.

Jun *et al.* (1993) suggests that consumers who maintain cultural identity with a traditional culture may seek items such as garments with symbolic meanings. The traditional dress serves as a symbol which plays an important role in establishing meaning among its people and functions more than a covering but embodies social as well as cultural information about the wearer. As demonstrated in this study, usage of the traditional dress serves as a means of communicating and expressing one's pride in the cultural heritage of Ghana. Thus the link between perceived importance of dress as a material culture item and its utilisation has been confirmed in this study.

It is also evident that the participants use the traditional dress to confirm not only to themselves but also to others that they are indeed Ghanaians which in turn enhances their group membership (Hamilton, 1991). This aspect of sharing mutual interests and artefacts in turn gives the individual a sense of belonging and results in interconnectedness among the group. This study supports the argument that conformity to groups' norms brings social approval and reassures the individual (Kaiser, 2002). Most of the participants also embraced this material symbol not only for identity construction but to elicit positive response about their appearance which enhances their self esteem. This plays a very important role in maintaining the self in 'space and time' relations (Eicher and Sumberg, 1995). Thus this research strengthens the views of the symbolic Interactionists perspective in understanding meaning within the socio-cultural context.

In order to establish Ghanaian women's attitude towards the traditional dress, other aspects to determine a link between demographic factors and the symbolic meanings of

dress were also explored. Past research has established the use of clothing as an indicator of social status (Davis, 1992; Barnard, 2002). The findings confirm that meanings assigned to the traditional dress include social identity which is communicated through the use of this dress. The research found the age of the participants has a greater impact on the meanings assigned to the traditional dress and underlines the use of dress in identity construction. The findings revealed that younger participants associated the meaning of slit and kaba more with cultural heritage (Forney and Rabolt, 1985-86; Cui and Adams, 2002) and religious values whereas the older participants associated meaning more with financial status, respect and reflection of age. An explanation for the younger age group's association of the traditional dress to religious values may stem from its extensive body coverage (shoulder to ankle) which could be linked to a level of modesty as prescribed within the Ghanaian culture. The use of prestige or branded items to enhance one's social standing is documented in the literature (Kaiser, 2002; O'Cass and Frost, 2002) and Littrell (1980) found the fabrics used for the traditional dress to have prestige values. It is evident that the older participants use prestige fabrics as a means of symbolic representation of the social self as found in this study. It also appears as if older participants may be financially independent and can therefore afford more expensive fabrics such as ceremonial hand woven *kente* and expensive wax prints which are used to express or enhance their social and financial status.

With regard to education and meaning, the findings indicated that the more educated participants associated the meaning of dress more with sense of belonging, financial status and status in society whereas the less educated participants associated the meaning more with cultural heritage, Ghanaian identity and reflection of age. The differences between education and meaning may be due to the fact that the less educated would generally cling to traditional values and norms than the very educated that are likely to adopt more western values through education and formal work. It is reasonable to assume that the more educated participants may use the symbolic meanings of the traditional dress to construct, maintain and express their social identities (Dogbe, 2003; Salm and Falola, 2002; Davis, 1992) and therefore use prestige fabrics to satisfy these needs.

It is worth noticing that married participants in this study associated the meaning of traditional dress with respect and reflection of age which may be linked to societal

expectations of women and the derived self esteem. Therefore, the slit and kaba is an important dress to the Ghanaian woman and serves as a means of presenting the body as a social entity with cultural meaning.

8.3 Evolution of Traditional Dress

Previous research has established that traditional dress is not static but may undergo change over time (Eicher, 1995) and others have found some of these dresses have been hybridised with components from other cultures (Maynard, 2004; Salm and Falola, 2002; Lynch, 1999; Matthews, 1979) in today's globalised world. There is therefore the reduction in the gap of what used to be a design of a typical traditional dress as it has taken more western features. The current study has established the evolution of the Ghanaian traditional dress in terms of the fit and detail as a result of certain external factors which are linked to the influence of western dress through the media and internal factors such as improved technology and skills. The improved skills could however be attributed to the fact that there are currently more qualified graduates from the polytechnics and universities who have entered the garment manufacturing sector of the micro-small scale enterprises as compared to previously, as established from the current study. In terms of improved technology, Roach-Higgins and Eicher, (1992) asserted that the advancement of technology of a particular group of people leads to the advancement of their aesthetic attributes of their dress pattern which is in line with the findings of this study.

The current study confirms that the fit of the traditional dress has significantly changed over the past decade as it has taken more western features and as a result has become more simplified. The change in fit is attributed to western dress which is used alongside the traditional dress for formal work and other non-traditional functions and also the emphasis currently placed on women's figures. The preference for fitted garments suggests that the importance placed on women's body forms globally seems to be present in Ghana as the traditional dress seeks to accentuate the contours of the figure (Dogbe, 2003). It is evident that the evolution of the traditional dress in terms of fit and the emphasis placed on women's bodies may have a sexual connotation which is linked to the preference for fitted garments especially around the torso.

The symbolic meaning and usage of traditional fabrics have played an important role in the evolution of the traditional dress as found in the current study. There is evidence that other fabrics are currently used for the traditional dress which may be due to globalisation and the influence of western dress as already discussed. And although, traditional motifs continued to be used for the wax prints, there seem to be a shift in the colour schemes of fabrics that are currently used which are more vibrant as compared to the traditional subdued ones previously used. The findings however indicated the use of traditional wax print fabric is still the most popular as seen in Littrell's (1980) study. It is interesting to note that the use of ceremonial hand woven kente has also gained popularity although these fabrics are very expensive as compared to the traditional wax prints. The increased usage of the hand woven kente due to the prestige attached to it may be due to the fact that some participants' select fabric types and quality to reflect their financial status as found in this study.

However, the findings seems to challenge the classification of a type of dress as traditional which denotes lack of change or slow to change (Eicher, 1995). As demonstrated in the current study, the traditional dress has undergone several changes which may require a reclassification (Lynch, 1999) in order to incorporate these changes.

8.4 Utilisation of Traditional Dress

The current research indicated the usage of the traditional dress as a gender-specific dress worn in Ghana to define womanhood and is linked to maturation. This signifies the socially prescribed gender roles within the traditional society and includes child bearing, provision of care for the home and children.

Choice of Design

Dogbe (2003) suggested that the choice of dress for an African is directed by the socio-economic and cultural factors and as a result it is important not to separate the individual from the framework against which these choices are made. The attitudes consumers have toward clothing influence their choices (Alexander and Presley, 2005) and how these items may be used. It was observed in the current study that only a minority of the participants select their designs from western style catalogues although

more than half agreed to its positive effect on the development of the slit and kaba. It could however be argued that although most of the participants observed the effect of western fashion on the traditional dress, only a minority really do select designs from these catalogues which explains the trend in the findings. On the other hand, the findings revealed that most of the participants select their designs from traditional style catalogues which underpins the importance of the classification of the slit and kaba as a traditional dress. Although there seem to be other sources such as designs from the sub-region, televisions, news papers among others from which designs could be chosen, the most preferred source for the participants was from the traditional catalogues.

In relation to age, the high preference for choice of design from western style catalogues by the younger participants is evident whereas older participants preferred more traditional designs for the slit and kaba. It appears that the choice of modern traditional dress may be because younger participants wear more western dress as school and work clothes than the older participants which could have a direct influence on the choice of styles selected by these participants. This finding concurs with the study of Lynch (1999) in which she found the preference for new-style fashionable traditional dress by Hmong youths over the old-style traditional dress.

In the same manner there seem to be a high preference for choice of design from western style catalogues by the more educated participants which could be linked to the preference for western garments as an indication of being modern and civilised. The preference for modified traditional dress by the more educated participants in this study is similar to the findings by Kuma (1999) in which more educated South African women in her study preferred modified traditional dress over the classical traditional dress.

Preference of Garment Attributes

Several researches have been conducted on the importance and effect of garment attributes in relation to consumers in the purchase decision making process (Abraham-Murali and Littrell, 1995; Zhang et al, 2002; Chattaraman and Rudd, 2006). According to Zhang *et al*, (2002), information on product attributes from consumers is important to both the manufacturer and the retailer in the garment industry.

It is notably significant from the findings that all the garment attributes have scored well over seventy percent which suggest a high level of importance placed on all the attributes by the participants. It is evident that the most important attribute listed in order of preference was fit, quality of sewing, fabric type and quality, style details, colour of fabric and price which underlines the importance of these attributes in the garment manufacturing process. Fit therefore is one of the most important quality dimensions that can contribute to garment satisfaction of consumers. These are similar with those found by Zhang *et al*, (2002) in China in which the five most important garment attributes were fit, comfort, style, colour and workmanship in order of preference. This suggests that the preference for these garment attributes appear to be universal as appearance has become an important aspect in maintaining the self, therefore consumers interest in these attributes cannot be over emphasised.

The findings in this study concurs with Brown and Rice's (1998) model on the dimensions of clothing quality which strengthens the importance of both intrinsic and extrinsic attributes to consumers. Thus, the consumer expects garments to fit more especially when made-to-measure technique is employed. However, the findings suggest that consumers in the current study are unhappy with the fit of the traditional dress as expressed in the focus group interviews which may be attributed to the improper utilisation of anthropometric data by the manufacturers. This finding underpins the importance of the development of a sizing system and the adoption of mass customisation for the manufacture of the traditional dress as part of the current study. Quality of sewing and fabric type may represent the physical and aesthetic dimensions of a garment and in a culture where premium is placed on both sewn and unsewn fabrics one would necessarily ensure the good use of fabrics.

It is interesting to note that the consumers' demographics did not have any impact on the preference for the garment attributes which is very significant and implies that consumers in general prefer garments that are well made and fit the contours of the body properly.

Utilisation of Traditional Dress

The meanings individuals assign to an item of clothing may affect their choices and how these items are used. For the majority of the participants in this study who are engaged in formal employment in the Ministries and the Polytechnics, weekends may by the only times that traditional dress is worn for traditional functions such as funeral,

church, traditional marriages and other traditional festivals. Formal work clothes in Ghana, as a result of British colonisation are the same as in western cultures and globalisation has further helped in promoting western garments which is emphasised by Dogbe (2003).

It appears that the use of slit and kaba as a traditional dress in Ghana varies according to the occasion whether traditional or western. As a result it is reasonable to conclude from the percentage scores (all well above sixty percent) that, the slit and kaba is worn more often for formal traditional occasions which include funerals, traditional marriages and festivals. Although there seem to be no rigid rules of dressing, it is deemed appropriate to wear traditional dresses for traditional functions. Salm and Falola (2002) concurs that the choice of appropriate garments for the various occasions in Ghana cannot be overemphasised as there are strict dress codes which are governed by the norms and values of the Ghanaian culture. In Ghana, there are strong traditional customs for funerals and memorial services which demand strict adherence to the cultural norm in terms of dress usage.

Similarly, the findings also show a high usage of traditional dress for church. And although church is not considered as a traditional function, slit and kaba may be mostly worn for modesty reasons to show reverence for God and the religious service. Usage of traditional dress for religious values received weak ranking but it is worth noticing that most of the participants often wear the slit and kaba for church. The findings are consistent with the literature in which Matthews (1979) found seventy percent of her participants wore slit and kaba for church. From this one can conclude that, although there is a high usage of slit and kaba for church, most of the participants may not utilise it for religious reasons which is very significant. The use could possibly be tied to a notion of modesty, reverence for God, and solemnity of church worship.

There was however low usages for non-traditional functions which agree with those found in the literature. Forney and Rabolt (1985-86) and Matthews (1979) observed low usage of ethnic dress for school and work which may be because these functions may be considered as western in nature and therefore affect the use of traditional dress. The reason was that the respondents use more contemporary western dress for everyday life as found in this study. This once again strengthens the classification of the slit and kaba as a traditional dress as it emphasises its usage for traditional functions.

Previous research has established the effect of age (Matthews, 1979; Dogbe, 2003; Salm and Falola, 2002) on the utilisation of the traditional dress which emphasised the link to maturation and womanhood. The high usage by the older participants supports the above views and underlines the social and cultural significance of this dress. These differences in usage may be because younger participants would have developed a taste for western fashion and therefore utilise the traditional dress for only special occasions such as traditional marriages and church.

Maynard (2004) suggest the consumption of western clothing among certain cultures is seen as a sign of progress as opposed to clinging on to traditions. It appears this may be the case in this study as the less educated use more traditional dress than the more educated participants. It could be because in Ghana, being scholarly is associated with being civilised and modern therefore the preference for western dress by the more educated. It could also be there are strict dress codes in the government ministries which do not allow the use of traditional dress. These findings are similar to Matthews (1979) who concluded a high utilisation of slit and kaba among uneducated mothers and their educated daughters.

In the same manner, income seems to have a high impact on the traditional dress as those participants with higher income utilise this dress more than those with lower income. The explanation for this difference may be due to the fact that owning this dress is directly linked to the ability to purchase the cloth/fabric and also pay for its workmanship by the dressmakers as this dress is produced as a made-to-measure garment. Although one would argue that there are varieties of price ranges of the fabrics used for the traditional dress, some of which may be very cheap therefore income should not have an impact on the utilisation of the traditional. However, it is reasonable to assume that those in the higher income groups would regularly purchase more new traditional dresses than those in the lower income groups.

The findings also indicated that the older age groups earn more income than the younger age groups which may explain the effect of income on the utilisation of the traditional dress as older participants utilise this dress more than the younger participants.

The usage of slit and kaba does not only portray Ghanaian identity and cultural heritage, but signifies the socially prescribed gender roles of women within the traditional society. This view seemed to be confirmed through the higher usage of traditional dress by married participants than unmarried participants and thus imply the usage of the

traditional dress may be linked to gender roles definition. These roles may include child bearing, provision of care for the home and children as well as the extended family. In Ghana, there appears to be emphasis placed on marriage as the dowry price may include at least six 'half-pieces' of wax prints as discussed in section 2.9.2 which in effect underlines the importance of the usage of traditional dress by married women as cultural expectations. The findings have established the use of the traditional dress in communicating marital status as it defines the socially prescribed roles of women within the community. In most societies, it appears that marriage is marked by rites of passage from childhood to adulthood which often requires the change in dress, and respect is accorded to such acts within the society as found in this study.

8.5 Acceptance of Mass Customisation

Mass customisation is referred to as the mass production of individually customised goods based on customer specifications. The literature has revealed mass customisation as a manufacturing strategy that offer the consumer individualised products and services at the same time catering for the mass market (Istook, 2002; Gilmore and Pine, 1997; Fiore, et al 2001; Anderson, et al., 1997). In terms of apparel production several studies have been conducted into consumers' willingness to accept this strategy (Fiore, et al., 2001; Lee, et al., 2002; Fiore, et al., 2004). However, the high interest in mass customisation of garments stems from the issues with fit of mass produced garments and this strategy seem to be a panacea for solving these problems.

Understanding how mass customisation may be accepted by both manufacturers and consumers was explored in the current study. The study revealed the participants in this study generally rejected the traditional dress to be mass produced which agrees with the findings of (Dogbe, 2003). This is due to its cultural significance which is central to the utilisation of this dress. Contrary to the above, the participants were rather in favour of mass customisation which they believe preserves the uniqueness of the traditional dress as one of its main attractions. From the manufacturers' point of view, there seem to be a preference for mass customisation is seen to be the natural progression from the current production system in terms of its development. The preference for mass customisation may be because, currently, the traditional dress is customised and mass customisations also seem to cater for individual needs and preferences through product differentiation. However, the manufacturers believed certain changes such as the development of a

sizing system and the standardisation of the production process needed to be done before this strategy could be adopted.

Similarly, the consumers believed mass customisation is needed to improve the quality and fit of garments as the use of skilled labour could solve some of the problems that are currently experienced. At the moment, there is evidence of the use of unqualified trainee apprentices which compromise the quality of the garments produced. This is not surprising as the findings revealed that the most important garment attribute for the consumers is fit and good finishing. Therefore the importance of garment fit and quality to the consumer cannot be overemphasised as demonstrated in the current study. It is worth noticing that the consumers are of the view that mass customisation could be a panacea to the issues of fit and poor quality of garments. Anderson, et al. (1997) and Lee, e al. (2002) found fit to be a critical issue in apparel mass customisation which is also emphasized in this study.

In terms of the acceptance of mass customisation, majority of the participants (69.7 %) in this study have expressed the willingness to accept as well as (73.2 %) are ready to utilise this strategy. The high preference for mass customisation may be due to the issues related to fit and quality as confirmed in this study. The participants further suggested that the garment sector as a whole could be restructured if mass customisation is adopted. Choy and Loker (2004) also conducted a study on mass customisation of wedding gowns on the internet which confirmed a high interest in the willingness to design and purchase the gown.

In evaluating the benefits of mass customisation in the development of the traditional dress, there is an indication that the majority of the statements scored well over sixty percent which was notably high. Benefits to the state were ranked higher in terms of job creation and promotion of the textiles industry than benefits to the individual such as improved fit and quality. These findings contradict those found earlier on in the interviews where fit and quality of sewing was found to be paramount to the consumers. However, the statement on affordability scored the lowest percentage which implies a perception that, the benefits of mass customisation could come at a price as quality often does.

With regards to age and acceptance, the younger participants associated the mass customisation of the traditional dress more with improved fit and quality whilst the

older participants more with affordability, promotion of the textile industries and traditional fabrics. The younger participants' choice of improved fit and quality of workmanship may be due to the preference for more fitted garments than the older participants. It is apparent that, as the importance placed on women's body form increases; younger participants may become more conscious of their figure and would therefore be interested in emphasising it through the use of more fitted garments. The older participants on the other hand may be more interested in job security as their responsibilities increase hence the preference for benefits to the state rather than individual benefits

Similarly, education seem to have a high impact on the mass customisation of the traditional dress with more educated participants' preference for garment fit and workmanship and less educated participants' preference for the creation of jobs. Thus the more educated may be more interested in enhancing their appearance and social status with well fitted and quality garments than the less educated participants.

8.6 Current Production Methods of the Traditional Dress

The second objective of this study focused on the evaluation of the manufacture of the traditional dress in relation to mass customisation which was achieved through participant observation and interviews with the manufacturers of this dress. The observations suggest that the main type of garments produced by the enterprises may be classified as the classic and the modified traditional dresses as concluded in section 8.4.

8.6.1 Company Profiles

Company profiles provide an insight into their operations and reveal other business information. The importance of the traditional dress within the Ghanaian culture (Dogbe, 2003; Salm and Falola, 2002; Matthews, 1979) is revealed in the target group for all the enterprises which ranged between 15-60 years. This range demonstrates the significance of traditional functions in the Ghanaian culture and the emphasis on conforming to prescribed dress practices for women.

The current study has found that majority (20) of the firms in this study operate at the micro category (one to five workers) level in terms of firm size which is consistent with other surveys (Sowa et al. 1992) and are predominately female owned. It is worth noticing that only three and two out of the twenty-five firms could be classified as small

and medium size categories respectively which imply that the production of the traditional dress is predominantly done at the micro level. This is seen in the number of full time employees although most of the enterprises had several trainee apprentices. Past research has documented the use of trainee apprentices as a source of labour in the informal manufacturing sector in Ghana (Mensah, Tribe and Weiss, 2007; Morton, 2004; Fianu and Zentey, 2000; Kayanula and Quartey, 2000) as found in this study. It however appears that the use of unskilled labour may compromise the quality standards as the production of garments is generally classified as labour intensive (Zwane, Richards and Edmond, 2002). Formal education is a prerequisite for sewing as the ability to read and write is important in the obtaining and utilisation of accurate anthropometric data. It was revealed that majority of the dressmakers had received training in free hand cutting (Fianu and Zentey, 2000; Fianu and Acquaah-Harrison, 1999) which is directly linked to the utilisation of anthropometric data in relation to the fit of garments. Given the importance of transforming body measurements into patterns, one would expect these dressmakers would have acquired adequate training in pattern making which is critical to garment fit. In fact this research has rather shown the opposite as most of the manufacturers in the current study do not have adequate skills in pattern making as the basic requirement for garment fit.

8.6.2 Equipment

A significant number of the enterprises observed operating at the micro level had simple domestic equipment which was very unsatisfactory (Fianu and Zentey, 2000) and implies that only basic sewing procedures are undertaken. It is therefore reasonable to conclude that most of the dressmakers in the micro category observed in this study may be classified as home dressmakers in terms of the type of the equipment owned and the number of full time employees. It is evident from the findings that Fidler and Webster's definition of the informal sector as a small enterprises that 'use low technology methods of production and management' (1996, p. 5) is applicable to this study. Several researchers have also observed that the SME development is constrained by numerous factors such as finance, equipment and technology and access to international markets (Steel and Webster, 1992; Baah-Nuakoh and Teal, 1993; Aryeetey, 1994).

It appears that the lack of industrial equipment by most of the dressmakers hinder large-scale production and efficiency in terms of meeting deadlines for garment orders by

their customers which was emphasised as a problem in the focus group interviews with the participants. The use of ultra-modern equipment is necessary in replacing manual machines in order to facilitate the production process as this will in turn promote the garment industry in particular and the economy as a whole. According to Glock and Kunz (2005), the development of intrinsic quality such as fit may require a large investment in materials, equipment and skills. They suggest that the use of advanced technology and automation increases efficiency and accuracy. The dependency on manual equipment may also be as a result of the fact that most of these enterprises started as home businesses which initially required less capital for start-up by the owner-managers. Some of these enterprises moved outside their homes to the current workshops when they begun to grow although most of them still relied on their basic equipment.

Another hindrance to micro-small scale enterprises is the lack of access to funds or credit (Fening, Pesakovic and Amaria, 2008) needed to purchase industrial equipment for expansion as most of them are considered not organised enough to qualify for credit from the financial houses which is one of the characteristics of the informal sector in Ghana. Although most of the owner-managers expressed the availability and the need for modern equipment in the interviews, it appears that most of them may be hindered by lack of funds to actually purchase these equipment. The findings of the current study are contrary to those of Fianu and Zentey (2000) in which garment manufacturers in their study expressed the unavailability of sewing equipment and spare parts for their enterprises.

8.6.3 Utilisation of Anthropometric Data

According to Kemsley (1967, p. 65) the ultimate usefulness of anthropometric data lies in using the data to solve design problems. Manufacturers of clothing use anthropometric data to define the appropriate fit dimensions for their target groups in order to satisfy their needs. Generally, the made-to-measure process is mainly utilised in this study and requires accurate body measurements of individual consumers to produce garments that conform to their body shape and specifications.

The Collection of Anthropometric Data

The observation revealed that the manufacturers obtain anthropometric data from their customers and underlines the importance of a good body measurement and consistency is vital in the production of fitted clothes. These measurements are obtained through the traditional method by the use of the ordinary tape measure. This implies that the manufacturers value and strive for the need to obtain accurate body measurements from their customers. The number of body measurements taken by each dressmaker varied significantly although the key dimensions (bust, waist and hip) were taken by all the manufacturers. This suggests that the key dimensions are important measurements in garment construction as they form the basis (Bougourd, 2007) for garment size. It is interesting to note that the same numbers of measurements are taken for both the traditional and western dresses by the dressmakers which confirm the evolution of the traditional dress. Among these measurements, the bust girth, waist girth, lower hip girth, front waist length, wrist and the side waist to ankle are taken by all the dressmakers and suggest their importance in the manufacture of the traditional dress. One would however expect that measurements such as the shoulder width and length, across chest and back and the cervical to waist measurements are taken by all the dressmakers in order to ensure the good fit of garments. The fact that some of these measurements are not taken may have important implications in relation to garment fit. The focus group interviews confirmed that most of the consumers of the traditional dress in the current study are dissatisfied with the fit of the garment. One possible reason may be because most of the manufacturers do not obtain and utilise enough body measurements required for the manufacture of this dress which may result in poor fit. From the literature, it is evident that in order to achieve the good fit of clothes it is essential to have a good relationship between the garment and the contours of the body (Chen, 2007) by obtaining the appropriate measurements. Istook and Hwang (2001) suggest it is impossible to deal with consumers garment fit issues without a set of accurate and adequate body measurements.

Utilisation of Anthropometric Data

The proper utilisation of anthropometric data by garment manufacturers may result in the good fit of garments produced for their consumers. Similarly there is an indication that the manufacturers utilise the anthropometric data of their consumers' for the production of made-to-measure traditional dresses. It is evident that the free hand

cutting technique is the preferred method used by the dressmakers (20) in this study to obtain patterns for the production of the traditional dress which agrees with other studies (Fianu and Zentey, 2000; Fianu and Acquaah-Harrison, 1999). The interviews revealed the preference for this technique is because it is considered as an easier approach which is claimed to be more appropriate, faster and simpler than the flat pattern technique. However, this method of utilising body measurements appears to have several disadvantages as already discussed in Section 6.2.5 and could affect the fit of the garments produced. This assertion is however confirmed by the minority (five) of the manufacturers who utilise flat patterns in addition to the free hand cutting technique for more complicated and difficult designs which they explained produces more accurate and better fit of the garments. This is a clear indication of the strengths of the flat pattern drafting technique which makes one to wonder why this is not extensively used. One of the major challenges for most of the manufacturers is the low level of education as one requires a higher skills training especially in mathematics and pattern drafting to be able to use this method efficiently. It has been established from the observations that flat pattern drafting is mostly not taught in the informal system of training through apprenticeship which explains the preference of the free hand cutting technique.

Similarly, it is clear that none of the dressmakers use any software for pattern making and other methods of obtaining garment patterns such as modelling or draping are also not used as most of these enterprises rely on domestic equipment. Considering the importance of utilising anthropometric data in garment manufacture, one may conclude that the change in form and fit of the traditional dress could become a challenge if the demands are to be met. This reiterates the evolution of the slit and kaba in relation to fit and form and suggests the increase in the level of difficulty in its construction due to these changes. It is apparent that as the traditional dress has taken more western features, there is the requirement to utilise advanced production strategies in order to meet the changing demands in terms of designs and fit which leads to the adoption of mass customisation.

8.6.4 Construction Techniques and Quality Standards

A standard reflect the overall intrinsic quality level of a firm and provides consistency of the products that are based on predetermined preferences of the target group and may

be linked to the aesthetics of the finished products (Glock and Kunz, 2005; Lin et al., 2002). Many researchers have established the importance of quality (North, de Vos and Kotze, 2003; De Klerk and Lubbe, 2008) to consumers and which is regarded as one of the main reasons for dissatisfaction with garment products. The process of producing quality garments requires adequate training and adherence to strict standard specifications (Glock and Kunz, 2005) set by the enterprise in order to meet the needs of the target consumer.

There is evidence from the current study which confirm the lack of national garment standards for the production of women's wear in Ghana. A possible reason of the lack of standards may be the reliance on custom made clothes and also because there has never been the need for the traditional dress to be produced as a ready-to-wear garment. As a result, manufacturers seem to struggle with quality and size requirements for consumers who request such standards. It could also be due the fact that the garment industry is not well developed in Ghana due to the reliance on made-to-measure garments therefore there has never been the need to standardise the production process.

Another important issue revealed was that most of the manufacturers observed in the current study do not match the motifs in the fabric whilst cutting out which may affect the aesthetic quality of the garments produced. In line with the above findings, majority of the participants in the focus group interviews expressed their dissatisfaction with poorly matched motifs in their garments which they attributed to the low level of education and skills of most of the manufacturers. Thus, apparel quality is related to the extent to which it satisfies the consumer's needs. Fiore and Kimle (1997) support this view and explained that consumers' satisfaction with the quality of clothing item may be directly linked to the aesthetic qualities of a garment. From the above it is clear that in order to satisfy the needs of the consumer, great emphasis should be placed on both the physical as well as the expressive functions of a garment. Morganosky and Postlewait (1989) found the elements of design such as pleasing lines and designs significantly influence the aesthetic quality of a garment.

On the other hand, the fact that cutting out was mainly done by the owner managers of these enterprises suggest the importance attached to this process although none of the enterprises use any powered cutting tool. This implies that the basic shears is used for all the cutting out processes and limits the amount of work that could be handled at a given time. The findings further revealed the lack of adequate knowledge on the effect

of cutting on the correct grain of the fabric which may affect the drape and the performance of the garments produced in terms of fit. Chen (2007) concurs that the grain line in garments must fall perpendicular to the floor and is an important aspect of fit which requires the relationships among the fabric, patterns and wearers. Thus the problem with fit of the traditional dress may stem from several sources as revealed from the findings in (Section 6.14.2) which confirms the dissatisfaction with the fit by the consumers.

Similarly, in terms of construction techniques, the findings revealed the utilisation of the whole garment production system (Fianu and Zentey, 2000) in which an individual completes the entire garment. Thus specialisation or the unit system which draws on the strengths of the individual to tackle procedures that one is good at is not utilised and this may result in poor quality of garments. Chimielowiec (1995) in a report on the Ghanaian textiles and garment industry described this system of garment production as non-industrial which limits the efficiency of the individual.

There is further evidence of the use of the flat method of joining garment pieces together and the use of very wide side seams which were generally closed and finished with an overlocking machine. The use of wide closed seams may affect the shape especially at the side seams of fitted garments. This is because seams play an important role in the physical appearance and performance (Abraham-Murali and Littrell, 1995) in terms of judging garment quality and fit. It could be that the large side seams are left as an allowance for growth as a result of the value placed on unsewn cloth and sewn garments respectively. Littrell (1980) found in her study that seventy percent of women continue to use their oldest cloths which may support the large side seams. This is because in the Ghanaian culture, the traditional dresses are not easily discarded as they may be passed down in the family as an inheritance which requires the judicious use of the fabric.

In terms of shaping materials processes, the underlining technique is mainly used which is considered as easier, faster and more convenient in terms of garment alteration and level of difficulty by the manufacturers. However, this method lacks the ability to hide the finished seams at the wrong side as in the case of full lining which contributes to the general aesthetic quality of garments. The preference for this technique may be the result of the level of formal training in clothing construction obtained by most of the

manufacturers which limits their performance. It is therefore reasonable for consumers to complain about the poor finishing especially of the wrong side of their garments as revealed in the focus group interviews which leads to the dissatisfaction of garment quality. As discussed under Section 8.4 the second most important preferred garment attribute by the consumers of the traditional dress is quality of sewing and therefore cannot be over emphasised.

8.7 Development of Sizing System

Several researches have been conducted on the development of sizing systems for different target groups (Vronti, 2005; Gupta and Gangadhar, 2004; Beazley, 1998; Otieno, 1999; Kemsley, 1957; Kunick, 1967). According to Istook and Hwang (2002) manufacturers can not solve the issues of fit without accurate body measurements and Kemsley (1957) concurs that the usefulness of any anthropometric data is to solve design problems. In line with the literature, the focus of the third objective of this study was the development of a sizing system for the mass customisation of the traditional dress for Ghanaian women.

8.7.1 Discussion from the Interviews

Interviews were conducted with three different groups in the current study to ascertain the need to develop a sizing system for Ghanaian women as the target group. It is evident that Ghana has never conducted any national anthropometric survey and as a result, there are no sizing systems currently available for the population. Winks (1997) suggests the need for anthropometric surveys for every population which has to be clothed which underlines the importance of sizing systems for the purpose of clothing manufacture. The reason why Ghana lacks a sizing system may be linked to the fact that there has never been the need to produce the traditional dress as a ready-to-wear garment and with the absence of large production; there has never been standardised sizes in Ghana. Another possible reason could be due to the reliance on made-to-measure system of production as discussed under Section 8.3 which does not necessarily require standard sizes. However, as the traditional dress evolves and a lot more women utilise ready-to-wear garments, there is the need to categorise women's body forms through the development of a sizing system.

The need to develop a size chart specifically for the Ghanaian woman in relation to the differences in the body shape was confirmed through a general consensus from the participants in all the three groups interviewed. Vronti (2005) and Otieno (1999) concurs that size charts must be local to cater for the specific needs of a particular population. This view was supported in this study as a result of fit problems experienced by the participants especially around the hip and thigh areas of ready-to-wear garments from other countries using their body measurements. Miller (1993) found that black women have distinct fit and proportion needs as supported in the current study. As a result several sizing systems have been developed to cater for specific variations in populations which lead to the increase of consumers' satisfaction with garment fit (Chun-Yoon and Jasper, 1993). Giddings and Boles (1990) also found in their study that black male subjects had specific fit problems found around the thigh area due to differences in body proportions which underpins the development of size charts for a specific population. The manufacturers in this study explained frustrations in using other size charts due to the inconsistencies in the coding as well as differences in the set of body measurements.

The findings further revealed the development of a sizing system is viewed by the participants as a step in the right direction to promote the garment industry in general and bedrock for the development of ready-to-wear garments in Ghana. This is because, apart from the traditional dress, women utilise western dresses for everyday use such as formal work and for other western functions.

8.7.2 Discussion from the Anthropometric Survey

The development of a sizing system requires the use of anthropometric data from the target population and requires the number and size ranges that are needed (Le Pechoux and Ghosh, 2002). As a result anthropometric data was collected through the manual anthropometric method and used to develop body measurement tables for the sample under study through descriptive statistics. Although the use of 3D and 2D body scanners are faster, accurate and more efficient (Bougourd, et al., 2000) the cost and availability of these systems are often beyond the reach of many researchers as in the case of this study.

The arithmetic mean was used (Winks, 1997) as an indication of the central tendency which has been utilised in previous studies (Vronti, 2005; Gupta and Gangadhar, 2004; Otieno and Fairhurst, 2000; Otieno, 1999; Beazley, 1998). The statistical results were presented in Chapter Seven (Section 7.2) showing the mean, standard deviations and multivariate correlations which is important in showing the relationship among the various body parts (Winks, 1997). There was high correlation among the body parts which indicated a good relationship based on the BS 7231 (BSI, 1990) standard used as a guideline for identifying strength of relationships. The results revealed that weight was the single variable that correlated most (nine strong and four mild correlations) with other body dimensions after which the bust, waist and the hip all had (seven strong and six mild correlations) respectively. However, the height had only one strong and two mild relationships with the other body parts probably because few lateral measurements were taken in this research (See Tables 7.4 and 7.5).

The selection of key dimensions is critical in the manufacture of well fitting garments (Yoon and Jasper, 1996; Winks, 1997) and as a result the body dimensions that had the most relationships with the other body parts were selected as the key dimensions. These included the bust, waist and hip which is consistent with other studies (Vronti, 2005; Gupta and Gangadhar, 2004; Otieno and Fairhurst, 2000; Otieno, 1999; Beazley, 1998). Although the height did not show several strong correlations with other measurements, it was selected as a key dimension as it is often used as a good predictor of other lateral measurements and therefore critical in garment sizing as used in other studies. It has also been established in this study that the selection of the key dimensions are central in the development of a sizing system as it defines ones figure type and for the achievement of garment fit. Weight was not selected as a key dimension although it had the most strong correlations as it is not practicable to measure (O' Brien and Shelton, (1941) and it may not always indicate the actual body size required for garment fit. The selection of key dimensions may also be based on the type of garments to be produced as suggested by (Petrova, 2007).

In the turning of the raw data into a body measurement chart, three approaches were explored in order to arrive at the most suitable required for good fit. In all the approaches used, the arithmetic mean was identified as the base size (12) for the purpose of this study and the standard deviations were utilised as the size steps in the first two approaches (mathematical and the two size) respectively. The mathematical

approach was used in other studies (Vronti, 2005; Otieno and Fairhurst, 2000; Otieno, 1999; Beazley, 1998) in which the mean was increased and decreased by the standard deviations (+1, +2, -1, and -2) and half standard deviations to identify the lower and upper limits and created five sizes in all. However, it was observed that the large standard deviations from the descriptive statistics made the size steps not practicable for garment manufacture and fit as presented in Table 7.7 and discussed under Section 7.7.1. The large standard deviations may be due to the wide range among the body dimensions of the subjects of the anthropometric survey. This had practical implications for the development of size charts as body types differ and are not universally the same which requires an approach that caters for regional differences.

In order to resolve the issue with the wide intersize intervals, another approach was explored which was originally used by Mlauli (2003) and involved splitting the data set into two groups using the hip as a guiding point (refer to Section 7.7.2). The mean and standard deviations were used as discussed in the mathematical approach. With this approach although the size steps for the average group size was quite within an acceptable range, those for the large group were still too wide (Refer to Appendix 7 for the body chart for the two groups). Due to the fact that the sizes were based on around the hip girths and not the total body shapes, there were confusion regarding the body shape classification which is central to the development of size charts. Also this approach created two different size charts and large intersize intervals for the large group which were not ideal for the achievement of good fit.

The final approach was used by (Beazley, 1998) in which data ranges were divided into seven sizes and used as the size step which resulted in a reasonable size step of 5cm for all the key dimensions (bust, waist and hip). In the current research however the data range was taken from the 5^{th} to the 95^{th} percentiles in order to remove the extreme outliers which might distort the data (Winks, 1997) for all the body dimensions. The modified size chart was presented in Table 7.8 and was adopted as the final body measurement chart for this study. Although Beazley only used this approach for the key dimensions, this study on the other hand utilised this method for all the body dimensions as it produced more acceptable size steps (see Section 7.7.3) for the detailed procedure. In order to reduce the number of outliers, six sizes (8-18) were created (See Table 7.9) and as a result the developed size chart covers about 80 percent of the total population surveyed. This underlines Winks (1997) explanation that, in order to achieve

acceptably good fit of ready-to-wear clothes and make a range manageable, a manufacturer may cater for the 80th percentile of the surveyed population. Size codes were thus determined for the new size chart denoting Ghana as (GH8, GH10, GH12, GH14, GH16, and GH18).

8.7.3 Evaluation of Size Chart for Ghanaian Women

A critical analysis of the body chart revealed that the measurements of the key dimensions (bust, waist and hip) were larger compared to measurements from other surveys presented in Table 7.12. This implies that the key dimensions (bust, waist and hip girths) of the average Ghanaian size 12 are larger than those found in other studies (Zwane and Magagula, 2007; Vronti, 2005; Gupta and Gangadhar, 2004; Beazley, 1998; Winks, 1997). This supports the findings reported in SizeUSA that the girth measurements for black women were found to be larger than those of the whites and Hispanics (cited in Bougourd, 2007). This may be attributed to the fact that plumpness is adored in the Ghanaian culture (Antuban cited in Roach and Eicher, 1973) and perceived as the ideal figure type and supports the views found in the literature that plumpness in certain developing countries is linked to high social status, health and wealth (Aghekhan, et al., 2005). However, the height of the sample was found to be shorter when compared to other surveys with the exception of those found in Gupta and Gangadhar's (2004) study which indicates that the average Ghanaian woman is shorter than the white ethnic populations examined in other studies. Similarly, the drop value (difference between the bust and hip girths) of the current study was found to be the same as those found in Vronti's (2005) survey on Cypriot subjects. Thus, the suggestion that size charts should be local (Vronti, 2005; Otieno, 1999) to cater for differences supports the findings of the current survey which was necessary to address the unique proportion needs of the Ghanaian woman.

With regard to the intersize intervals of the body chart, the findings compares favourably with other surveys (Zwane and Magagula, 2007; Gupta and Gangadhar, 2004; Beazley, 1998; Winks, 1997). Although the BS EN (BS EN 13402-3, 2004) standards recommends an intersize interval of 4cm as a guideline among the key dimensions (bust, waist and hip) girths, the current study's of (5cm) does not deviate too much from these standards and those found in other European countries(Winks, 1997). This may be attributed to the fact that average measurements of the key

dimensions found in this study are larger than the average size of other studies. The conceptual framework and the mass customisation model were developed from critically analysing the findings from the first three objectives are presented in the next chapter which addresses (objectives 4 and 5)

CHAPTER 9 The Development of the Conceptual Framework and Mass Customisation Model

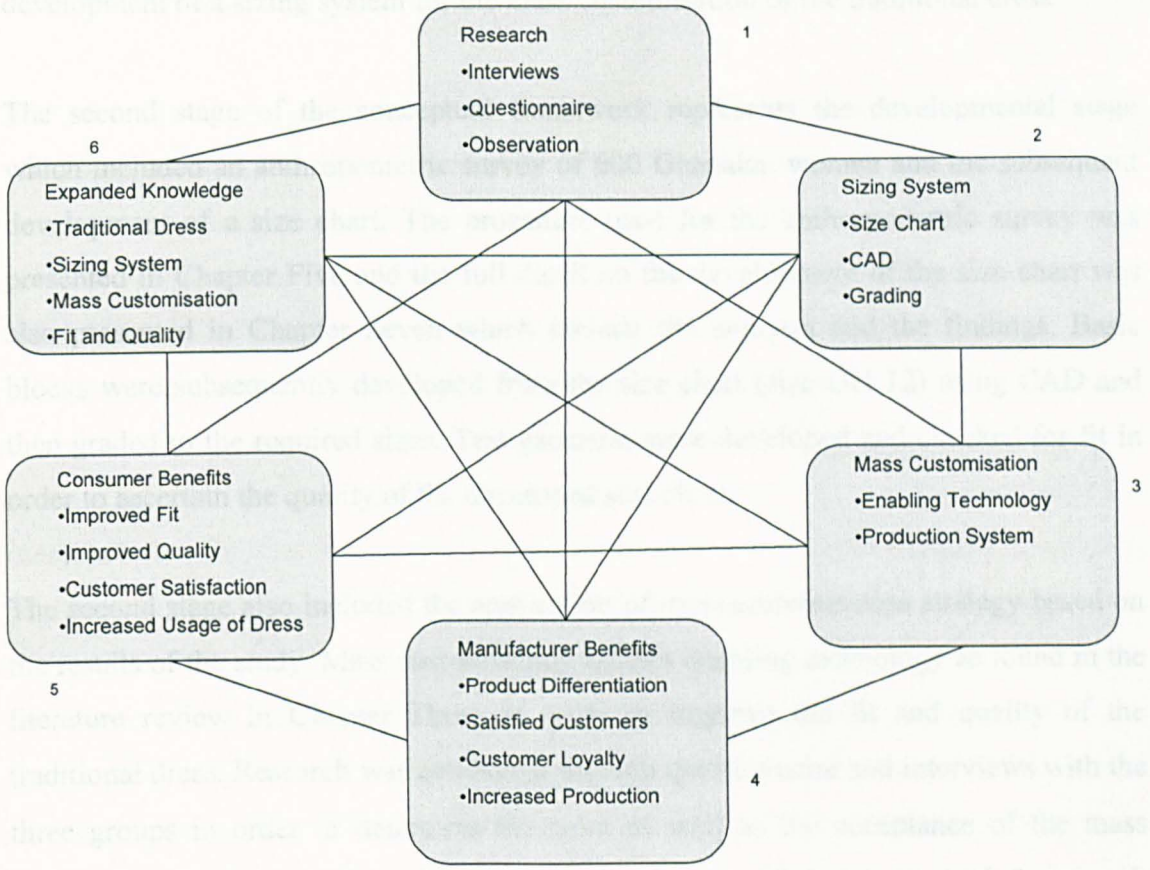
9.1 Introduction

In this chapter, the conceptual framework for a sizing system developed from the analysis of the data from the manufacturers, stakeholders and the consumers of the traditional dress on the meaning and utilisation of the traditional slit and kaba, the current production methods and the evaluation of the Ghanaian size chart is presented. The model developed for the mass customisation of the traditional dress is also presented.

9.2 The Conceptual Framework

Based on the findings from the research, a conceptual framework regarding a sizing system, quality of fit and the utilisation of traditional dress was developed which addressed the fourth objective of the study. The conceptual framework is important in the understanding of the various aspects of the research and how it fits into the general aim. Figure 9.1 represents the framework developed from this study which is seen in three stages.

Figure 9.1: The Conceptual Framework



Key:

1. Input
2. Development
3. Application

4, 5, and 6. Expected Output

It is obvious from Figure 9.1 that the various aspects of the conceptual framework are linked and therefore dependent on each another. The first stage of the conceptual framework represents the research and methodology undertaken in this study which involved both primary and secondary data. This was analysed through quantitative approach using the SPSS and qualitatively, by grounded theory. The research included interviews with manufacturers, stake holders and focus group interviews with consumers of the traditional dress. Questionnaires were also administered to the consumers in order to evaluate their attitudes towards the utilisation of the traditional dress in relation to mass customisation. Participant observation was also employed to assess the current production methods of the traditional dress. A detailed explanation of the methodology used was explained in Chapter Four and the analyses of the findings

were presented in Chapter Six. The findings from the research necessitated the development of a sizing system for the mass customisation of the traditional dress.

The second stage of the conceptual framework represents the developmental stage which included an anthropometric survey of 600 Ghanaian women and the subsequent development of a size chart. The procedure used for the anthropometric survey was presented in Chapter Five and the full detail on the development of the size chart was also presented in Chapter Seven which include the analysis and the findings. Basic blocks were subsequently developed from the size chart (size GH 12) using CAD and then graded to the required sizes. Test garments were developed and checked for fit in order to ascertain the quality of the developed size chart.

The second stage also included the application of mass customisation strategy based on the results of the study. Mass customisation utilises enabling technology as found in the literature review in Chapter Three in order to improve the fit and quality of the traditional dress. Research was conducted through questionnaire and interviews with the three groups in order to determine the need as well as the acceptance of the mass customisation of the traditional dress. The final stage of the conceptual framework represents the contribution and benefits of the current study and illustrates the output from the first and second stages.

From a theoretical point of view, this study is important in addressing the issues of fit and quality of the traditional dress and also provides an expanded knowledge in terms of the development of size a chart and the mass customisation strategy. Benefits and contributions from this study are in three aspects which include those to the manufacturer, the consumer and for academic and research purposes. The utilisation of the developed size chart and the application of mass customisation strategy by the manufacturers are expected to facilitate the production of the traditional dress and thereby provide better fit and quality. Product differentiation by the manufacturers would increase consumer satisfaction and loyalty which may lead to increased production. The benefits for consumers include improved fit and quality which leads to increased satisfaction and thereby promote greater utilisation of the traditional dress. The developed size chart could be used for the mass production of western garments by manufacturers in the garment sector in Ghana. The developed size chart is important as the basis for other anthropometric surveys in Ghana since this is the first to be

conducted and the detailed procedure on its development could be used for academic training and research purposes.

Fit and quality are important issues currently in garment production in Ghana for manufacturers and consumers. As discussed in Chapter Three, the quality of the fit of garments is dependent on the utilisation of accurate anthropometric data in developing patterns for garments. Thus, critical to pattern making is how anthropometric data is obtained and the way in which these measurements are utilised. Generally, sizing contributes to garment quality as consumers are interested in garments that enhance the appearance through good fit as it functions to conceal or enhance the necessary body parts. Garment fit problems are costly and frustrating for both consumers and manufacturers in the form of returned merchandise or time wasted in garment production. Ashdown and O'Connell (2006) observed that good fit requires a proportional balance between body and garment that can only be achieved through development and implementation of appropriate sizing systems. Well fitting clothes are therefore paramount in consumer satisfaction as this enhances appearance and confidence because a well developed sizing system helps to provide clothes that fit.

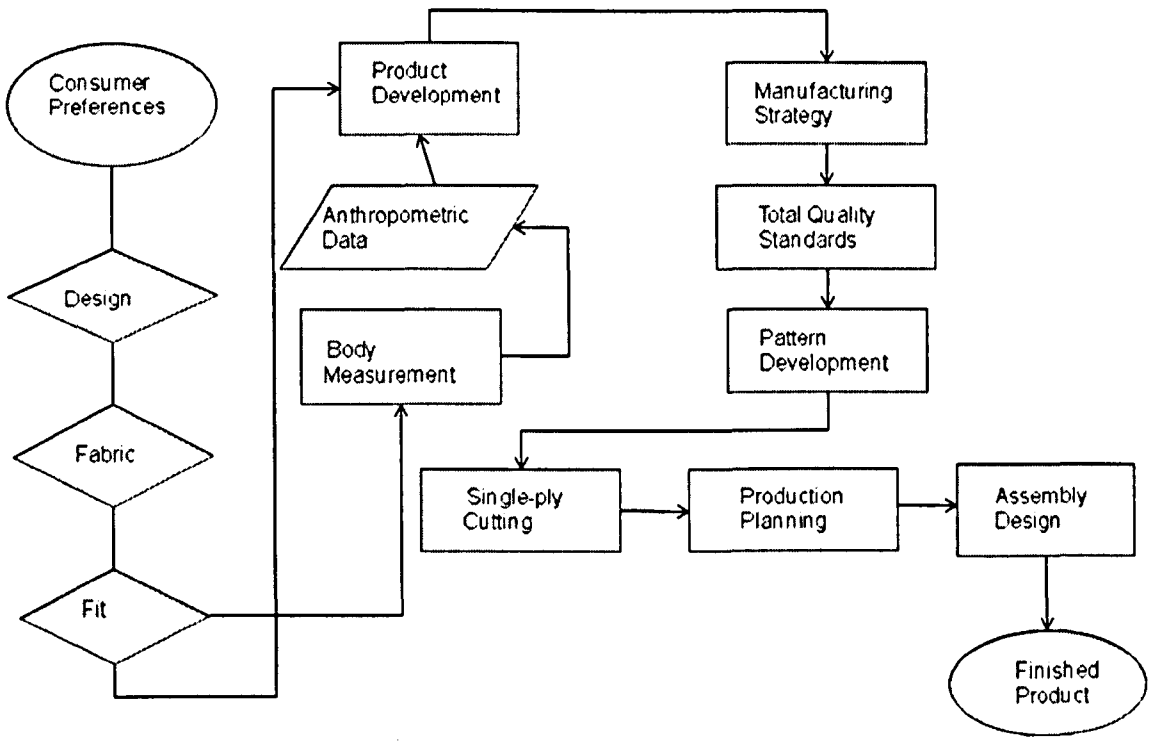
It is clear from the conceptual framework that the development of a size chart and the application of mass customisation by manufacturers could provide well fitting and quality garments that would satisfy consumer clothing needs. It is also expected that the benefits from the current study could be used as a foundation for other researches which underpins the cyclical nature of the conceptual framework as important in maintaining the links among all the components.

9.3 The Mass Customisation Model

The final objective for the current research required the development of a model that promotes the utilisation of anthropometric data for mass customisation. According to Loker (2007) mass customisation requires enabling technologies and the efficiency of the production processes as it incorporates advanced production methods. The production model developed in this study begins with the consumer needs in terms of fabric, design and fit and uses the review of literature and the findings from the research as the basis for the model building. The model is presented in Figure 9.2 which focuses on the mass customisation process and was centred on consumer needs in terms of fabric, design and fit and uses the review of literature and the findings from this study as

the basis for the model building. The model was also based on the evaluation of the current production methods and related literature which focuses on the mass customisation process.

Figure 9.2: The Production Model



The consumer needs were generated from the findings from the questionnaire and the focus group interviews in terms of fit and quality issues and the acceptance of mass customisation of the traditional dress. The production of garments in mass customisation is driven by the consumer through the demand of specific needs as the goal is to provide choices. The consumer's demand in the model included fit, fabric and design which was revealed in the findings on the garment attributes.

The adoption of mass customisation strategy was based on the findings from the interviews in relation to the three groups' preference of mass customisation over mass production. The cultural significance of the traditional dress was also seen as a barrier to the use of mass production as the current production strategy of custom made ensures individuality and uniqueness through the utilisation of the individuals' body measurements and design preferences. The key benefit of mass customisation is that consumers' demands are met through personalisation of products which eliminates consumer sacrifices according to (Pine, 1993).

The application of mass customisation requires manufacturers to make investment in the acquisition of necessary equipment such as 3D to capture the body measurements of the consumers as well as employ CAD for the utilisation of the information into patterns. This also includes the adoption of flexible production systems which supports mass customisation of garments. The purpose of using enabling technologies is aimed at improving product development and production efficiencies which is seen as the basis of mass customisation. The application of enabling technology such as body scanning facilitates the mass customisation of garments as the individual consumers' body measurements are needed for the required patterns for the garments. New technological advances in manufacturing techniques such as single ply cutting and unit production systems make mass customisation of garments possible. It is evident from the literature that mass customisation relies on the use of enabling technologies in the implementation of this strategy if the needed results such as fit and quality is to be achieved.

In mass customisation of garments, the consumer needs to be involved in measurement acquisition and fit preference processes as the garments are personalised to individual specifications. The use of accurate anthropometric data is seen as a means of addressing consumers' problems with fit and is considered as an important aspect of apparel mass customisation. This is because it is evident from the literature (Chapter 3) that the use of standard sizes for garment manufacture may be the basis for consumers' dissatisfaction with fit. The process of mass customisation is aided with a 3D body scanner that captures the body measurement without any physical contact. Therefore, the ability to accurately capture the body measurement of the individual consumer through the use of 3D technology is paramount in addressing the issues of garment fit. The focus group discussions revealed the participants desire to have accurate body measurements taken by the manufacturers in order to achieve well fitting garments. Istook and Hwang (2001) are of the view that accurate body measurements are an important requirement for addressing the consumers' problems with fit. It is evident from the developed model that the production process begins with the acquisition of the consumer's body measurement through enabling technologies such as a 3D body scanner.

The use of CAD facilitates the utilisation of anthropometric data from the consumer for the development of patterns for garment production. A well fitting garment is dependent on the accurate interpretation of the anthropometric data into patterns in order to

achieve a good relationship between the body and the garment. In this regard, the application of CAD programs facilitates efficient custom pattern making to fit individuals based on the body measurements. CAD also promotes the grading of standard patterns into individualised ones to correspond to the measurements of the consumer thereby eliminating the preparation of patterns from the scratch which may be time saving. It is evident from the literature in Chapter three that appropriate utilisation of anthropometric data eliminates trial and errors and ensures the good fit of garments which is vital in satisfying consumers as seen from the focus group interviews.

Quality assurance is vital in all the stages of garment production in order to ensure the expectations of the consumer are met in terms of quality, fit and performance of the finished garment (Glock and Kunz, 2005). The findings of the research established that the consumers are interested in garment attributes such as fit, quality of sewing, fabric type and quality, style details and colour of fabric, listed in order of preference. It can be seen from the model in Figure 9.2 that quality assurance is applied in all three stages of the production process which underlines its importance. It is expected that the application of quality standards will result in the finished garments satisfying the consumer demand.

As observed in Chapters Three and Seven, it is evident that the role of mass customisation of garments is to meet consumer demands through product differentiation and addressing issues of fit. It is therefore expected that adequate information flow and the utilisation of accurate anthropometric data in the production process would improve the fit and quality of the traditional dress thereby meeting the demands of the consumers.

9.4 Chapter Summary

The development of the conceptual framework and the mass customisation model are important aspects of the study which links theory to the practice of garment manufacture. It clearly demonstrates the linkages among the various aspects of the study thereby revealing the benefits and the contribution to knowledge. It is expected that by adopting the mass customisation strategy would address consumer issues with fit and quality leading to the satisfaction of clothing needs.

CHAPTER 10 Conclusions

10.1 Introduction

The purpose of this study was to develop a sizing system for the mass customisation of the Ghanaian traditional dress, slit and kaba and the findings were discussed in Chapter Eight. This study was also undertaken to contribute to knowledge by making available literature on the symbolic meaning and utilisation of the traditional dress as well as to develop appropriate methods of production that improves the fit and quality.

10.2 Traditional Dress

Based on the extensive search adopted in this study, it was found that there was limited literature that documents the meaning and utilisation of the traditional dress although this dress is widely used among women in Ghana (objective 1). As a result, this study adopted a multiple data collection strategy through triangulation and found that the slit and kaba is a traditional dress with strong "cultural connotation" which serves as a link between Ghanaian identity and cultural heritage. The symbolic meaning is important within the Ghanaian society and serves to facilitate communication in the everyday life of individuals as they interact with one another. One of the basic functions of dress is communication and this study reiterates the role of dress in the establishment of social and cultural identities which facilitates interaction within the Ghanaian society. This finding contributes to the works of Dogbe (2003), Eicher and Sumberg (1995) and Roach-Higgins and Eicher (1992). It was evident from the analysis in Chapter Seven that, the respondents attach several meanings to the traditional dress and highlight the fact that demographic factors such as age, marital status, income and education significantly influence the representation of meaning and utilisation of this dress.

The findings on the usage of the traditional dress for mostly traditional functions strengthen its classification as a traditional dress. As a result, this study provides an insight into the importance of the traditional dress and its cultural significance which underpins the relationship between dress usage and associated meaning. The findings of this study lend support to Blumer's (1969) premises on Symbolic Interactionism and its focus on the meaning of objects, their interpretation and social actions' as well as Kaiser's (2002) basic assumptions of underlying appearance management. This study

therefore contributes to the body of knowledge on the usage of traditional dress in defining ethnic as well as national identity and may be an important tool in the preservation of cultural heritage for the participants in this study as its usage symbolises the agreement with the norms and values of the Ghanaian society.

It was evident from the consumer questionnaire and focus group interviews as well as the interviews with garment manufacturers and the stakeholders that, the traditional dress has undergone a considerable amount of change over the years. This contributes to the view that culture is not static and contradicts the perception that traditional dresses may remain unchanged. However, this study supports the views of Eicher (1995) that traditional dresses may change over time. Several factors such as western dress, the media and technology have contributed to the evolution of the traditional dress in terms of fit and form. These changes are seen in the designs as they have become more simplified and much fitted which has led to increase usage especially for non traditional functions. As the traditional dress has taken more western features as observed in this study, the suggestion that most traditional dresses have been hybridised by Maynard (2004) and Salm and Falola (2002) is supported.

The participants revealed the traditional dress has become more fitted and implies that the Ghanaian woman has become more conscious of the body form as pertains in the western world. However, the part of the body that is emphasised through the choice of design is linked to the cultural significance of women's body forms within the Ghanaian culture. This finding suggests that globalisation has the ability to affect the material culture of societies as the values and norms are altered through the interaction with people from other cultures. As demonstrated in this study, the traditional dress has undergone several changes which may require a reclassification (Lynch, 1999) such as modernised traditional dress in order to incorporate these changes. It is therefore the conclusion of this study that the slit and kaba be classified as a modernised traditional dress. The contribution of this study is its emphasis on the utilisation of this traditional dress and the symbolic meaning within the social and cultural context and explains why the slit and kaba is still a popular dress form in Ghana.

10.3 The Ghanaian Size Chart

This study highlighted the formulation of research based body measurement chart (objective 3) from raw data and detailed the procedures involved in determining the key dimensions and intersize intervals. However, it was apparent from this study that there is the need for more literature on the procedures regarding the development of size charts as garment fit cannot be improved without the use of accurate body measurements. With the exception of few authors such as Roebuck (1995) and Beazley (1997, 1998, and 1999) who outlined the procedures for the development of size charts, there was the lack of literature detailing such procedures. This study has therefore contributed to the literature on the step-by-step procedures needed for the formulation of size charts.

The interviews with the participants highlighted the need to develop size chart for Ghanaian women in order to cater for the differences in body forms among different races. In terms of the Ghanaian size chart, it was evident from the analysis of the anthropometric data in Chapter Seven that the measurements of the key dimensions (bust, waist and hip girths) of the Ghanaian woman were found to be larger than those found in other surveys. This supports the findings reported in SizeUSA that the girth measurements for black women were found to be larger than those of the whites and Hispanics (Bougourd, 2007). The height measurement was also found to be shorter than those found in other studies among white populations. It is therefore the conclusion of this study that the use of other size charts for the manufacture of garments for the Ghanaian woman will be too small and due to height differences, the garment may not be proportionate. This agrees with the view that although styling may be globally desired, the development of size charts must be local to take into account the fit issues that exist among different populations and races as suggested by Otieno (1999).

The Ghanaian size chart coded GH 8 to GH 18 with key dimensions as bust, waist and hip girths as well as height and concludes that the selection of key dimensions as the basis for size chart formulation is very important in the determination of sizes of individuals as it emphasises the relationship among the body parts. This study concludes that the bust girth be used as the predictor of sizes for the upper section of the body and the hip girth should be used for the lower section of the body. Also, the height should be used as the determinant for lateral dimensions of the body and the selection of key dimensions should be based on the type of garments to be produced as suggested by

(Petrova, 2007). The large standard deviations found among the body dimensions of this study had practical implications for the development of size charts as body types differ and are not universally the same; therefore there is the need for an approach that caters for regional differences among the various races.

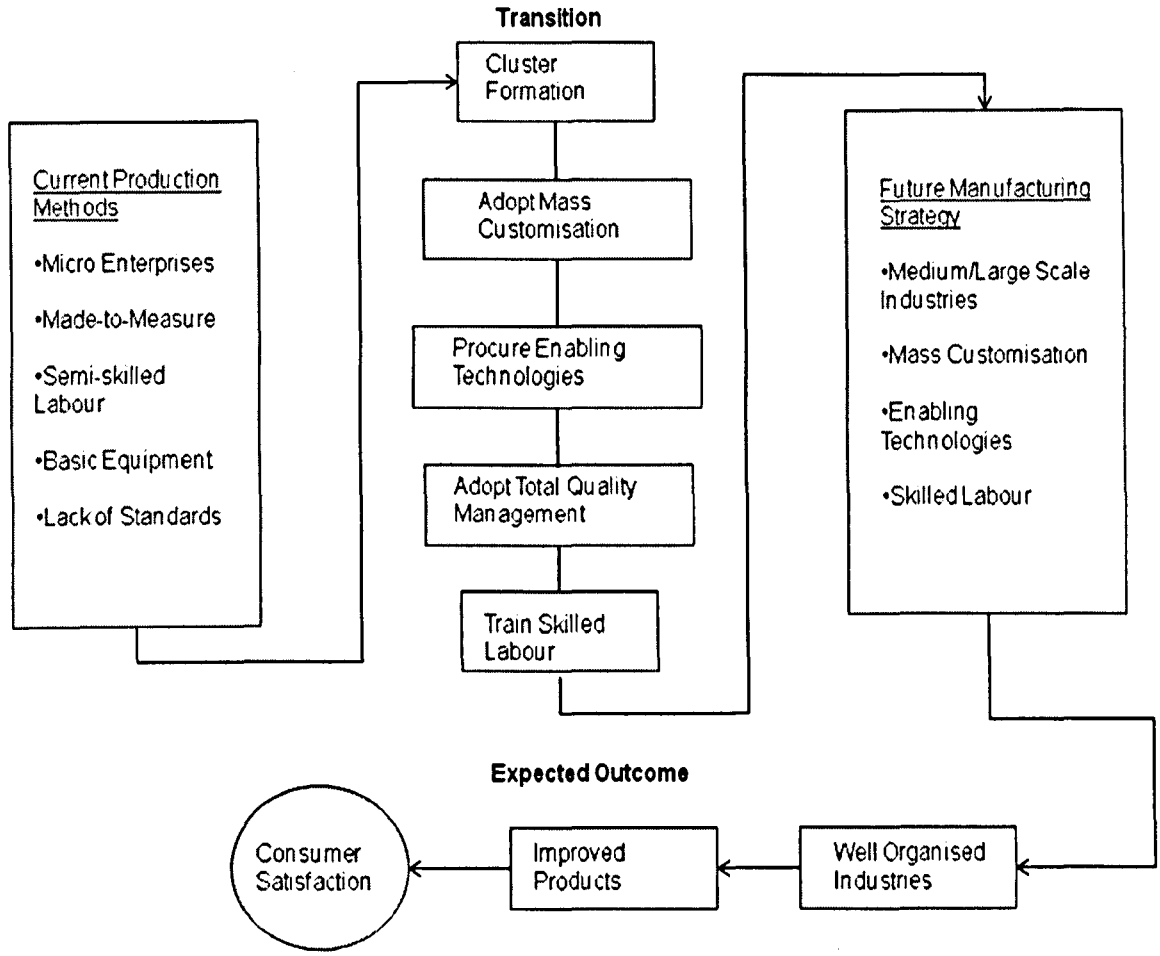
It is the conclusion of the current study that the body of the Ghanaian woman has cultural significance especially the torso section and greatly influences the ideal body form and is evident in the body measurements data. The findings of this study contribute greatly to knowledge on the body form information on the Ghanaian woman which may be used as a basis for other size charts since no anthropometric data exists on this target group. The study proposes the use of the current size chart for the production of garments for the Ghanaian market if well fitting garments are to be achieved for this target group.

10.4 Mass Customisation of the Traditional Dress

The fact that this study found the slit and kaba to be a cultural dress leads to interesting implications for the manufacturers in terms of the production strategy that is adopted as the findings revealed that the most important garment attribute for the participants is fit and good finishing. It is therefore not surprising that the participants in this study rejected the mass production of the traditional dress due to the fear that it might lose its cultural significance. The preference for mass customisation over mass production restate the preference for well fitting garments and individuality in clothing selection as well as product differentiation which is vital for consumer satisfaction. It is the conclusion of this study that mass customisation may be suitable for products that have cultural significance to consumers as a result of the values attached to such products. It is also evident from the findings that the reliance on custom made garments has negatively affected the development of the garment sector as a whole in Ghana.

Based on the findings of this study, the current production methods were evaluated in relation to mass customisation (objective 2). The study has therefore developed a process map for the current manufacturing practice, the concept for the future and the strategy for transition as presented in Figure 10.1. Loker (2007) suggests the goal of mass customisation is to offer the individual consumer variety of choices at an affordable price through the use of enabling technology.

Figure 10.1: Transition Process Map



As identified in this study, majority of the enterprises operate at the micro level which indicates the firm size and may hinder the adoption of mass customisation. Firm sizes are very important as it demonstrates the capabilities of the individual enterprises and may require the expansion from micro category to medium or large scale levels by forming partnerships and clusters in order to pull resources together. Adopting this approach would also enable the banking institutions to grant these enterprises long term loans needed for the expansion. Although micro size enterprises have their own advantages like quick decision making to respond to issues, it may be limited in terms of capital requirements needed for the expansion of the enterprise.

The over reliance on semi-skilled trainee apprentices as the labour source for these enterprises is likely to compromise the quality of the garments produced. The production process of garments is considered as labour intensive therefore trained and skilled workers are important to assemble garments properly in order to achieve the desired quality standards. The fit of garments does not only depend on accurate body measurements but also an efficient garment assembly process which eliminates sewing

errors such as seam puckering and incorrect matching of notches. Skills development is therefore necessary in adopting mass customisation strategy which is based on the efficiency of both employees and the equipment used.

Whereas mass customisation as a strategy is facilitated by enabling technology in order to achieve the required results (Loker, 2007; Lee and Chen, 1999) there is a clear indication that the enterprises in the current study utilise domestic equipment and production techniques which are non-industrial and requires a complete shift in the production methods. According to Loker (2007) mass customisation requires efficiency of the production processes as it incorporates advanced production methods which cater for small scale quantities such as single ply cutters and unit production systems. As a result, there is also the requirement for the adoption of advanced technologies in order to utilise mass customisation efficiently for the production of the traditional dress. The current production approach of custom making garments which caters for individual preferences is however similar to those used in mass customisation and therefore does not require any change.

In the current study, body measurements are obtained manually and most of the secondary measurements are not taken which affects the fit of the garment. In terms of the utilisation of anthropometric data, the free hand cutting technique used does not promote standardisation of garment standards. It is clear from the findings that this technique is not productive as it lacks consistency and does not provide good fit of garments.

Mass customisation of garments relies on accurate anthropometric data in order to achieve good fit of garments for the individual consumer which has become a critical issue in the adoption of this strategy (Anderson, et al., 1997; Anderson-Connell, Ulrich and Brannon, 2002). This is because the ability to customise garments largely depends on the availability of accurate and detailed body measurements of the consumer. The development of new technologies such as the 3-dimensional body scanning systems has facilitated anthropometrics and made the adoption of mass customisation of garments viable (Bougourd, 2007; Istook, 2002; Loker, 2007). With the 3D technology, individual body measurements are captured which are more precise than manual measurements and allow manufacturers to effectively meet the needs of consumers. Mass customisation also utilises CAD technology which is quick and accurate and

provides individualised patterns needed for production. It is therefore the conclusion of this study that the adoption of mass customisation for the traditional dress is expected to improve the garment sector in Ghana and facilitate economic growth.

10.5 Recommendations for Further Research

The research findings attempted to cover the gaps on the attitudes towards the Ghanaian traditional dress and the development of a size chart for the adoption of mass customisation. From the study, it is evident that further national anthropometric surveys should be conducted on the population of target groups such as men and children so as to have a data base for sizing systems. The development of other size charts will be in the right direction towards the promotion of the garment sector as a whole in Ghana thereby improving the fit of garments for the population since this has become an issue for both garment manufacturers and consumers as well.

The study also found the lack of garment manufacturing and quality standards on women's clothes in Ghana which is important in maintaining the quality of garments produced. There is therefore the need for the Ghana Standards Board (GSB) which is assigned with the duty of maintaining standards in the Ghanaian market to formulate garments standards on women's clothes in order to streamline the production processes and quality of the garment sector to make it more competitive and economically viable if the government's vision for this industry as becoming a major exporter is to be achieved.

The basis for the conceptual framework and the model developed in this study may be fundamental in the development of theories on the sizing and mass customisation of cultural products. The conceptual framework presented in Figure 9.1 could provide substantial information for the formulation of theories and other production models that are needed to solve the numerous problems in the Ghanaian garment sector. This study concludes that more research needs to be conducted in the area of garment sizing and product development for all target groups, an issue that concerns the economic development in Ghana today.

10.6 Limitations of the Study

As is true of any research effort, there are limitations of the current study. First of all, it is clear that although the findings revealed a difference among different groups, there was a biased in the sampling towards educated respondents. However, the sample reflects the consumer base, although there are uncertainties regarding extrapolation to more agricultural communities. Secondly, the sampling for the anthropometric survey was based on the willingness of subjects to participate which limited the use of random sampling. Finally, cultural barriers limited the body measurements to be taken over full under garments as suggested in the BS EN 13402 standards regarding the conduct of anthropometric surveys which necessitated the use of alternative garments.

10.7 New Contributions

The major contributions of the current study are listed below:

- Contribution to literature on the meaning and utilisation of traditional dress within the social and cultural context in Ghana.
- Expansion of knowledge on body measurement categorisation of Ghanaian women and literature on the procedure for the development of size chart.
- Development of a conceptual framework for a sizing system for SMEs in Ghana which facilitates the understanding of the linkage between theory and practice.
- Development of a model of information flow on the utilisation of anthropometric data for the mass customisation of traditional dress.

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Appendix 1 Sample Slit and Kaba Designs

Figure 1: Design in ntama and kaba
(Ghanaian Sunday Mirror, 27 January, 1957).

Figure 2: Design in slit and kaba
(Ghanaian Sunday Mirror, 9 May, 1965).

Figure 3: Modified Traditional slit and kaba
(Ghanaian Saturday Mirror, 23 December, 1995).

Figure 4: Modified slit and kaba, 2006 Design
(Photograph taken by researcher during fieldwork).

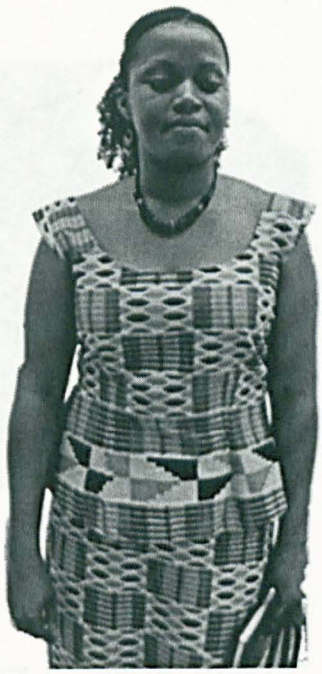


Figure 6: Traditional design in ceremonial hand woven kente fabric.(Photograph taken by researcher during fieldwork).

Figure 7: Traditional designs for the elderly. (Photograph taken by researcher during fieldwork).

Appendix 2 Photograph of Body Measurements

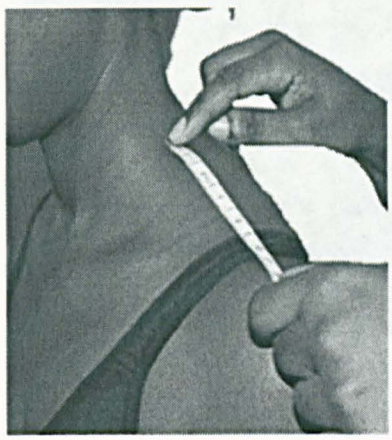


Figure 1: Shoulder length

Figure 2: Across chest

Figure 3: Neck Girth

Figure 4: Shoulder width

Figure 5: Under bust Girth

Figure 6: Waist Girth

Figure 7: Hip Girth

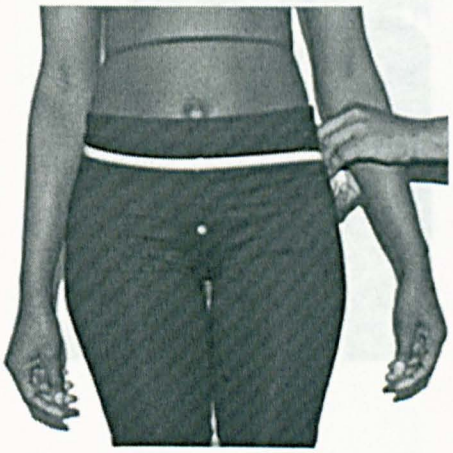


Figure 8: Upper hip Girth

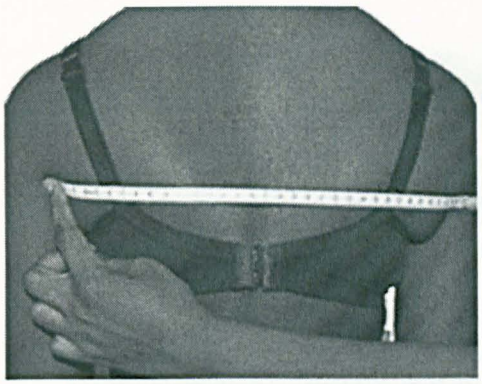


Figure 9: Across back

Figure 10: Bust girth

Figure 11: Front shoulder to waist

Figure 12: 7th Cervical to waist

Figure 13: Chest girth

Figure 14: Upper arm girth

Figure 15: Wrist Girth

Figure 16: Shoulder to wrist bone

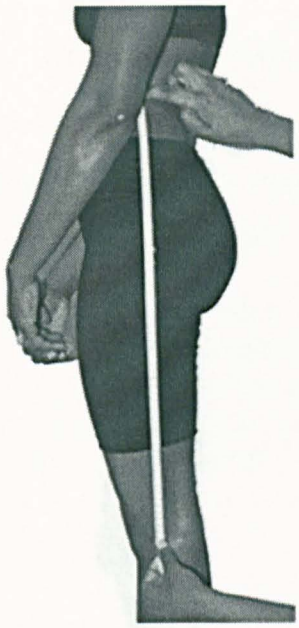


Figure 17: Waist to knee

Figure 18: Thigh girth

Figure 19: Waist to ankle

Figure 20: Weight

Figure 21: Height

Appendix 3 Checklist for Participant Observation

Section A: Company's Profile

1. Manufacturers code .....
2. Education.....
3. Number of workers ( ) Part-time ( ) Full time ( )
4. Location of Premises.....
5. Target Group (Age group).....
6. Core Business.....
7. Mission statement.....

.....

.....

Section B: Equipment in workshop

1. Type and number of sewing machines
   - **a)** Industrial ( )
   - **b)** Domestic ( )
   - **c)** Industrial and domestic ( )
   - **d)** Manual ( )

2. Specialised equipment

a) Cutting .....

.....

.....

b) Pressing .....

.....

.....

c) Auxiliary machines

.....

.....

.....

d) Pattern making .....

.....

.....

e) Others .....

.....

.....

.....

Section C: Sewing/Construction Techniques

1. Types of garments made

a) Traditional in local fabric.....

.....

...

.....

...

b) Traditional in western fabric.....

.....

..

.....

....

c) Western in local fabric.....

.....

.....

.....

.....

d) Western in western fabric.....

.....

.....

.....

.....

e) Others.....

.....

.....

.....

.....

.....

2. Laying and cutting out procedures

a) Examining of flaws in fabrics ( )
b) Matching of motifs /pattern alignment ( )

c) Cut on correct grain of fabric for design ( )

3. Seam construction

Suitability:-

a)	Stitch length for fabric	Yes	( )	No ( )
b)	Flat method	Yes	( )	No ( )
c)	Round method	Yes	( )	No ( )
d)	Others			
e)	Lining	Yes	( )	No ( )
f)	Underlining	Yes	( )	No ( )
g)	Seam finishes	Yes	( )	No ( )
h)	Design for fabric	Yes	( )	No ( )

Section D: Choice of Garments

1. How styles are selected

a) From western style catalogues
b) From local style catalogues
c) From customers own creative ability
d) Local designs in vogue
e) Western designs in vogue
f) Others

2. Fashion details on garments

a) Necklines
b) Collars
c) Sleeves
d) Armholes
e) Princess/panel seams
f) Empire seams
g) Bias grain effects
h) Traditional wrapper
i) Traditional slit
j) Cut and joined skirt
k) Others

3. Fastenings

a) Buttons and buttonholes
b) Buttons and loops
c) Zippers
d) Eyelet and cords
e) Press stud
f) Others

Section E: Knowledge of Sizing

1. Size charts used

a) Developed own sizing for customers
b) Made-to-measure
c) British sizing
d) American sizing
e) German sizing
f) Others

2. Method of obtaining pattern for garments

a) CAD
b) Flat pattern drafting
c) Free hand cutting
d) Modelling/drapery
e) Modify existing patterns
f) Others

Section F: Anthropometric Data

BODY DIMENSIONS MEASURED	Traditional	Western	GARMENT WORN	COMMENTS
Weight				
Height				
Neck girth				
Shoulder width				
Shoulder length				
Across chest				
Across back				
Bust girth				
Under bust				
Waist girth				
Hip girth				
Upper hip girth				
Thigh girth				
Front waist length				
7^{th} cervical to waist				
Upper arm girth				
Wrist girth				
Shoulder to wrist bone				
Waist to knee				
Waist to ankle				
Chest Girth				

Appendix 4a Interview Schedule for Manufacturers

A Study on Mass Customisation of Ghanaian Traditional Dress

Researcher's Notes:

- Interview schedule for garment manufacturers
- Interview
- Indicate the purpose of the interview
- Show appreciation of their participation in the interview
- State the duration of the interview, should last for approximately an hour
- Ask for permission to tape the interview and explain why you need to do this
- Reassure interviewee of confidentiality and explain that these information will not be passed on to competitors

Section A: Manufacturer's Profile

8. Name of Company.....
9. Number of years established.....
10. Number of workers.....
11. Location of Company.....
12. Target Group (Age group).....
13. Core Business.....
14. Sex Female ( ) Male ( )
15. Level of Education.....
.....

Section B: Meaning and utilisation of Traditional Dress

This section will look at the meaning of Ghanaian traditional dress as understood by the manufacturer

1. In your opinion can you define traditional dress?
2. In your view why do you think people wear traditional dress?
3. What messages do you think traditional dresses communicate about the wearer?
   - Aesthetic\expressive reasons
   - Cultural heritage, moral and religious values
   - Identity, age, gender, expression of self, mood, wealth\status and attitudes
4. Can you please tell me some of the messages?
5. What factors influence the choice of traditional dress of your customers?
6. Is there a relationship between ethnic background and the choice of traditional dress of your customers?
7. Do you think women are still wearing traditional dresses as compared to the past five to ten years?

8. Can you tell me for what occasions do they normally wear these dresses?
- If there is a decline can you explain some of the causes?

Section C: Evolution of Traditional Dress

This section will look at the change in form and fit of the slit and kaba

1. In your view has the form/style of the slit and kaba changed?
- If 'yes' can you explain in what way?
2. What factors has influenced the change in form/style?
- Technology
- Western culture
- Media
- Improved materials for construction
3. Can you explain if this change has affected the choice of style of your customers?
4. Can you explain if these changes in form have affected the fit and therefore require higher level of skills in the construction of the slit and kaba?
5. Please explain the normal procedures used by your customers to select their styles?
6. Do customers sometimes bring their dresses back because it does not fit properly?
- If 'yes' what do you do in such cases?
7. Is there any change in the choice of fabrics for the slit and kaba?
- If 'yes' what are some of the fabrics that are currently used?

Section D: Manufacture of Traditional Dress

This section will look at the way you measure your customers and determine their size for the manufacture of the slit and kaba

1. Can you tell me who normally takes body measurements of the customer?
2. What types of garments are worn before the measurement is taken?
3. How are these measurements taken and how many do you take in all?
4. Do you produce both traditional and western style clothes?
- What is the proportion of the two?
5. Do the measurements vary for slit and kaba and western type of garments?
- If 'yes' what are the differences?
6. Can you explain how you obtain patterns for the slit and kaba for cutting out
- Flat pattern drafting technique?
- Free hand cutting?
- CAD?
- Drapery/modelling?
7. Can you explain why you prefer that method of obtaining patterns?
8. Does the preferred method enhance the fit of the slit and kaba?
9. Is there a need to acquire current technology to improve pattern making?
- If 'yes' what type would you prefer and why?

Section E: Development of a Sizing System

This section will look at views on the need to measure Ghanaian women

1. Are there any standard size symbols or numbers that indicate sizes in Ghana today?
2. In your view is there a need to measure Ghanaian women in order to develop a sizing system? And do you think this will facilitate the manufacturing process?
- If 'yes' can you explain your reason(s)?
3. Do you sometimes use international sizing charts for production?
4. Which ones do you normally use and why?
5. Do you sometimes find them confusing to use because of the variations in the coding?
- If yes can you explain this?
6. Is there a need for the slit and kaba to be produced as mass customised dress?
7. Do you have size charts for your customers and how do you develop them?

Thank you for your time

Appendix 4b Interview Schedule Stakeholders

A Study on Mass Customisation of Ghanaian Traditional Dress

Researcher's Notes:

- Interview schedule for stakeholders
- Interview
- Indicate the purpose of the interview
- Show appreciation of their participation in the interview
- State the duration of the interview, should last for approximately an hour
- Ask for permission to tape the interview and explain why you need to do this
- Reassure interviewee of confidentiality and explain that these information will not be passed on to competitors

Section A: Stake holder's Profile

1. Stakeholder' code.....
2. Establishment.....
3. Position.....

Section B: Meaning and utilisation of Traditional Dress

This section will look at the meaning of Ghanaian traditional dress as understood by the stake holder

1. In your opinion can you describe traditional dress?

9. Is it necessary for people to wear traditional dress?
10. What messages do you think these traditional dresses communicate about the wearer?
- Aesthetic\expressive reasons
- Cultural heritage, moral and religious values
- Identity, age, gender, expression of self, mood, wealth\status and attitudes

11. Do you think Ghanaian women are still wearing the traditional dress as compared to the past ten years?
- If there is an increase/decline in the use of traditional dress, can you explain some of the possible causes?

5 Would you like to see the slit and kaba used for more formal occasions than it is currently?

used?

- What are some of the occasions you would like to see it used for?

Section C: Evolution of Traditional Dress

This section will look at the changes in form and fit of the slit and kaba

8. In your view do you think the fit and style of the slit and kaba has changed compared to the past five to ten years and in what way?
- To assess whether the fit of traditional dress has adopted more western features that requires specialised skills for construction
- Whether styles are chosen to resemble current western fashion trend
- Whether changes in West African clothing trends have affected the form/fit

9. What factors do you think has influenced these changes in fit and style?
- Technology
- Western culture
- Media
- Improved materials for construction
- Economic prosperity or poverty
- Improved skills of dressmakers

10. Can you explain if these changes have affected Ghanaian manufacturers of traditional fabrics for slit and kaba in any way?
11. Is there any change in the choice of fabrics for the slit and kaba?
- What are some of the fabrics that are currently used?
  (Wax prints, kente, lace, aso-ke, tie and dye and other African prints)
- Do you think this has had any effect on the development of the slit and kaba?

Section D: Development of a Sizing System

This section will look at views on the need to produce the slit and kaba as a ready-to-wear dress

1. Is there any size codes currently used by garment manufacturers in Ghana?
2. Can you tell me if there is any standard for garment manufacture that is/are used in Ghana that you know of?
3. In your view do you think it is necessary to take the body measurement of Ghanaian women in order to develop a sizing system?
4. In what way do you think this will affect the use and production of the traditional dress?
5. Is there a need for the slit and kaba to be produced as ready-to-wear apparel?
- Can you briefly explain in what way?

6. What impact do you think this will have on the garment industry and the economy of Ghana?
- Please briefly explain your reasons

7. Would you like the slit and kaba to be mass produced?
8. Would you like the slit and kaba to be mass customised?

9. Do you think the fit of the slit and kaba now requires manufacturers to use specialised production skills to meet the demands of the industry?

Section E: Promotion of the garment sector

This section will look at efforts being made by stake holders to promote the garment industry in Ghana.

1. Do you think that the skills acquired through apprenticeship are suitable for the traditional dress on the local market?
2. In your view, do you think the level of expertise of our dressmakers is suitable for competition in the global garment industry?
3. If yes/no, explain reason
4. Is there any technical assistance available to the small scale garment manufacturer?
5. Can you tell me the policies you have put in place to promote and protect the small scale garment manufacturer?
6. What financial assistance or package have they put in place to help the micro and small scale garment manufacturer since access to credit is one of their biggest challenge?
7. What are some of the changes you would like to see in the garment sector in Ghana?
8. How would you implement and sustain these changes?

Thank you.

Appendix 4c Interview Schedule for Consumers

A Study on Mass Customisation of Ghanaian Traditional Dress

Researcher's Notes:

- Interview schedule for consumers
- Indicate the purpose of the interview
- Show appreciation of their participation in the interview
- State the duration of the interview, should last for approximately an hour
- Ask for permission to tape the interview and explain why this is necessary
- Reassure the group of confidentiality

Section A: Consumers Profile

16. Group Code.....
17. Age Groups ( )

Section B: Meaning and utilisation of Traditional Dress

This section will look at the meaning of Ghanaian traditional dress as understood by the consumer

1. In your view can you define what traditional dress is?
2. Can you explain to me why you wear traditional dress?
3. Do you think the traditional dresses you wear communicate any messages about you?
4. Can you tell me what some of these messages are?
   - Aesthetic\expressive reasons
   - Cultural heritage, moral and religious values, group membership
   - Identity, age, gender, expression of self, mood, wealth\status and attitudes
5. Is there a relationship between your ethnic background and your choice of traditional dress?
6. Do you often wear traditional dresses and for what occasions do you normally wear these dresses?
7. Do you think there is a decline in your use of traditional dress as compared to the past five to ten years
   - Can you explain some of the causes?
8. Would you like to see the slit and kaba used for more formal occasions than it is currently used for?
   - What are some of the occasions you would like to see it used for?

Section C: Evolution of Traditional Dress

This section will look at the changes in form and fit of the slit and kaba

12. In your view do you think the fit and style of the slit and kaba has changed compared to the past five to ten years and in what way?
- To assess whether the fit of traditional dress has adopted more western features that requires specialised skills for construction
- Whether styles are chosen to resemble current western fashion trend
- Whether changes in West African clothing trends have affected the form/fit

13. What factors do you think has influenced these changes in fit and style?
- Technology
- Western culture
- Media
- Improved materials for construction
- Economic prosperity or poverty
- Improved skills of dressmakers

14. Can you explain if these changes have affected your choice of style?
15. To what extent has the change influenced your use of the slit and kaba?
16. What are the procedures you follow to select your styles for slit and kaba?
17. Do you consider your body size when selecting your styles?
18. Is there any change in the choice of fabrics for the slit and kaba?
- What are some of the fabrics that are currently used?
  (Wax prints, kente, lace, ashoke, tie and dye and other African prints)
- Do you think this has had any effect on the development of the slit and kaba?

Section D: Development of a Sizing System

This section will look at views on the need to produce the slit and kaba as a ready-to-wear dress

10. Do you buy ready-to-wear clothes?
11. Do you find it difficult to select the correct size because of the variations in the coding that are used?
12. Can you briefly tell me some of your experiences
13. Is there a need for the slit and kaba to be produced as ready-to-wear apparel?
- Can you please explain your reasons

14. In your view do you think it is necessary to take the body measurement of Ghanaian women in order to develop a sizing system?
15. In what way do you think this will affect the use and production of the traditional dress?
- Can you briefly explain in what way?

Section E: Manufacture of traditional dress

This section will look at how body measurements of consumers are taken for the production of slit and kaba

1. Can you tell me the procedure that is normally followed to take your body measurements?
2. What type of garments do you wear before these measurements are taken?
3. Are the same measurements taken for both the slit and kaba and western type of dresses?
4. Do you return your dresses because it does not fit properly and what was done in such cases?
5. Do you think because the fit of the slit and kaba has changed therefore the manufacturers require higher production skills to meet the needs of their customers?
6. Are you satisfied with the services you receive from you dressmaker?
- Are you happy with the quality of workmanship of your slit and kaba?
7. Do you think the level of expertise of our dressmakers is suitable for competition in the global garment industry?
- What are some of the changes you would like to see in the garment sector in Ghana?

Thank you for your time

Appendix 5 A Survey on the Mass Customisation of the Slit and Kaba

This questionnaire is for an academic research. The aim is to evaluate your attitudes toward the utilisation and evolutions of the traditional dress (slit and kaba).Your answers are critical to the development of the slit and kaba as a ready-to-wear outfit. Thank you for your willingness to complete the questionnaire.

Section A: Meaning, utilisation and evolution of slit and kaba

Please indicate whether you disagree or agree with the following statements. For each question circle the number that reflects how you feel **where 1 means strongly disagree; 2: disagree; 3: neutral or unsure; 4: agree; 5 strongly agree.**

	STATEMENTS	Strongly Disagree	Disagree	Neutral Or ..	Agree	Strongly Agree
1	I wear slit and kaba to be identified as a Ghanaian.	1	2	3	4	5
2	I believe that slit and kaba reflects my cultural heritage.	1	2	3	4	5
3	I believe that slit and kaba reflects my religious values.	1	2	3	4	5
4	I believe that slit and kaba reflects my moral values.	1	2	3	4	5
5	Wearing slit and kaba shows my status in society.	1	2	3	4	5
6	Wearing slit and kaba makes me look respectable.	1	2	3	4	5
7	I usually wear slit and kaba to reflect my age.	1	2	3	4	5
8	I wear slit and kaba to give me a sense of belonging.	1	2	3	4	5
9	I usually select the fabric for my slit and kaba to reflect my financial status.	1	2	3	4	5
10	I wear slit and kaba to express my mood.	1	2	3	4	5
11	I am admired and appreciated when I wear slit and kaba.	1	2	3	4	5
12	Please indicate whether the change in style has affected your use of slit and kaba for the following functions? **Please circle one number to reflect your level of use where 1 means never; 2: rarely; 3: sometimes; 4: often; 5: very often.**					

	FUNCTIONS	Never	Rarely	Sometimes	Often	Very Often
a	At home	1	2	3	4	5
b	Shopping	1	2	3	4	5
c	Work	1	2	3	4	5
d	Church	1	2	3	4	5
e	Weddings	1	2	3	4	5
f	Funerals	1	2	3	4	5
g	Traditional marriages	1	2	3	4	5
h	Traditional festivals	1	2	3	4	5
i	Naming ceremonies	1	2	3	4	5
j	Parties	1	2	3	4	5
k	Official/Public functions	1	2	3	4	5

13 Please indicate whether the change in fabric has affected your use of slit and kaba for the following functions? **Please circle one number to reflect your level of use where 1 means never; 2: rarely; 3: sometimes; 4: often; 5: very often.**

	FUNCTIONS	Never	Rarely	Sometimes	Often	Very Often
a	At home	1	2	3	4	5
b	Shopping	1	2	3	4	5
c	Work	1	2	3	4	5
d	Church	1	2	3	4	5
e	Weddings	1	2	3	4	5
f	Funerals	1	2	3	4	5
g	Traditional marriages	1	2	3	4	5
h	Traditional festivals	1	2	3	4	5
i	Naming ceremonies	1	2	3	4	5
j	Parties	1	2	3	4	5

14 Please indicate whether the change in fit, has affected your use of slit and kaba for the following functions? **Please circle one number to reflect your level of use where 1 means never; 2: rarely; 3: sometimes; 4: often; 5: very often.**

	FUNCTIONS	Never	Rarely	Sometimes	Often	Very Often
a	At home	1	2	3	4	5
b	Shopping	1	2	3	4	5
c	Work	1	2	3	4	5
d	Church	1	2	3	4	5
e	Weddings	1	2	3	4	5
f	Funerals	1	2	3	4	5
g	Traditional marriages	1	2	3	4	5
h	Traditional festivals	1	2	3	4	5
i	Naming ceremonies	1	2	3	4	5
j	Parties	1	2	3	4	5
k	Official/Public functions	1	2	3	4	5
15	In an average week, how many days do you wear slit and Kaba?					
16	Please rank the following in the order of the effect that you think it had on the development of slit and kaba in the last 10 years. **Where (1) is Insignificant;2:Moderate; 3:Neutral; 4: Significant; 5: Very significant**					

	ITEMS	Insignificant	Moderate	Neutral	Significant	Very Significant
	Influence of western fashion	1	2	3	4	5
	Improved sewing technology	1	2	3	4	5
	Influence of the media	1	2	3	4	5
	Improved skills of dressmakers	1	2	3	4	5
	Improved materials for construction	1	2	3	4	5
	Economic prosperity	1	2	3	4	5

17	In your opinion please rank the use of the following fabrics for slit and kaba today. **Where (1) least popular; 2: popular and 3: very popular.**			
	ITEMS	Least Popular	Popular	Very Popular
	Wax prints	1	2	3
	Lace	1	2	3
	Batik, tie and dye	1	2	3
	Kente	1	2	3
	Aso-oke	1	2	3
	Other African prints	1	2	3

Section B: Manufacturing and Mass Customisation of Traditional Dress

In this section we try to look at the importance of the manufacture of the slit and kaba. We also try to evaluate your acceptance of manufacturing the slit and kaba as a mass customised dress.

18	Please indicate where you select the style for your slit and kaba. **Please circle one number where 1 means never; 2: rarely; 3: sometimes; 4: often; 5: very often.**					
	ITEM	Never	Rarely	Sometimes	Often	Very Often
	From western style catalogues	1	2	3	4	5
	From traditional style catalogues	1	2	3	4	5
	From your own creative ability	1	2	3	4	5
	From dressmaker's own creative ability	1	2	3	4	5
	Designs that are currently in vogue in the sub-region	1	2	3	4	5
	From newspapers, magazines and television	1	2	3	4	5
19	How would you rate the workmanship of your last slit and kaba? **Please select one number.**					
	Poor (1) Fair (2) Average (3) Good (4) Excellent (5)					
20	Please indicate the relative importance of these aspects when you sew slit and kaba. Please rank them in order, where **(1) means insignificant; 2; not important; 3: neutral ; 4: important; 5: very important.**					

	ITEM	Insignificant	Not Important	Neutral	Important	Very Important
	Fit of the garment					
	Price					
	Quality of construction (sewing)					
	Fabric type and quality					
	Style details					
	Colour of fabric					
21	Do you buy ready-to-wear clothes? **Select one number that reflects your purchases.**					
	Never (1) Rarely (2) Sometimes (3) Often (4) Very Often (5)					

22	In your view is there a need for the slit and kaba to be produced as a mass customised dress? Yes ( ) No ( )					
23	Would you like to purchase it? Yes ( ) No ( )					
24	For what occasions would you like to purchase it for?					
25	The following statements relate to slit and kaba as a mass customised dress, please circle one number to reflect your view, varying from **where 1 means strongly disagree; 2: disagree; 3: neutral or unsure; 4: agree; 5 strongly agree.**					
	STATEMENTS	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	It will be readily available.	1	2	3	4	5
	The fit of the slit and kaba will improve.	1	2	3	4	5
	The quality of the slit and kaba will improve.	1	2	3	4	5
	The price of the slit and kaba will be more affordable.	1	2	3	4	5
	There will be variety of styles to choose from.	1	2	3	4	5
	There will be variety of fabrics to choose from.	1	2	3	4	5
	More jobs will be created.	1	2	3	4	5
	The textile industries will be promoted.	1	2	3	4	5

	It will create export avenues.	1	2	3	4	5
	It will promote the use of traditional dress	1	2	3	4	5

Section C: Demographic Data

City : Accra ( ) Kumasi ( ) Takoradi ( )
Education: Secondary ( )technical ( ) vocational school ( ) Polytechnic ( ) University ( )
Monthly Average income : Below ¢40.00 ( ) ¢40.00-70.00 ( ) ¢71.00-100.00 ( ) ¢101.00-140.00 ( ) ¢141.00-170.00 ( ) ¢171.00-200.00 ( ) Above ¢201.00 ( )
Age group :20-24 ( ) 25-29 ( ) 30-34 ( ) 35-39 ( ) 40-44 ( ) 45-49 ( ) 50-54 ( )
Marital Status: Married ( ) Single ( )

Thank you.

Appendix 6 Body Measurement Sheet

CITY..... DATE.....

CODE.....

	LANDMARKS	MEASUREMENTS										
1	Weight											
2	Height											
3	Neck girth											
4	Shoulder width											
5	Shoulder length											
6	Across chest											
7	Across back											
8	Bust girth											
9	Under bust											
10	Waist girth											
11	Hip girth											
12	Upper hip girth											
13	Thigh girth											
14	Front waist length											
15	7^{th} cervical to waist											
16	Upper arm girth											
17	Wrist girth											
18	Shoulder to wrist bone											
19	Waist to knee											
20	Waist to ankle											
21	Chest Girth											

Appendix 7a Two Size Charts - Average (299 women)

299 women (Average)

Body Dimensions	- Outliers	Mean -2 1/2 std	Mean -2 std	Mean -1 std	Mean	Mean +1 std	Mean +2 std	Mean +2 1/2 std	+ Outliers
1. Weight	0	40	43	49	55	61	67	70	0
2. Height	3	142	145	151	157	163	169	172	1
3. Neck Girth	1	27	28	30	32	34	36	37	0
4. Shoulder Width	0	33	34	36	38	40	42	43	6
5.Shoulder Length	0	10	11	12	13	14	15	16	8
6. Across Chest	0	27	28	30	32	34	36	37	3
7. Chest Girth	0	69	72	77	82	87	92	95	3
8. Across Back	0	27	29	32	35	38	41	43	1
9. Bust Girth	4	70	73	79	85	91	97	100	3
10.Under Bust	1	59	62	67	72	77	82	85	3
11. Waist Girth	0	53	57	64	71	78	85	89	7
12. Lower Hip Girth	7	79	82	87	92	97	102	105	0
13.Upper Hip Girth	4	69	72	77	82	87	92	95	5
14.Thigh Girth	2	41	44	49	54	59	64	67	4
15.Front Waist Length	5	34	35	37	39	41	43	44	9
16.7th Cervical to Waist	2	32	33	35	37	39	41	42	2
17. Upper Arm Girth	0	19	21	24	27	30	33	35	8
18. Wrist Girth	0	12	13	14	15	16	17	18	0
19. Acromion to Wrist	0	51	53	56	59	62	65	67	2
20.Sidewaist to Knee	2	47	49	53	57	61	65	67	0
21.Sidewaist to Ankle	4	86	89	94	99	104	109	112	0

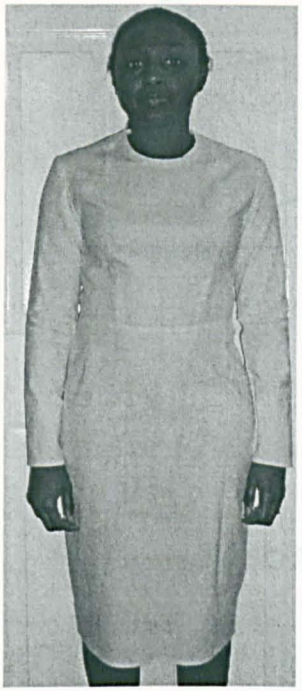
Appendix7b: Two Size Charts – Large (301 women)

Body Dimensions	- Outliers	Mean -2 1/2 std	Mean -2 std	Mean -1 std	Mean	Mean +1 std	Mean +2 std	Mean +2 1/2 std	+ Outliers'
1. Weight	0	44	51	64	77	90	103	110	6
2. Height	1	144	147	153	159	165	171	174	2
3. Neck Girth	0	29	30	32	34	36	38	39	7
4. Shoulder Width	0	31	33	37	40	43	46	48	1
5.Shoulder Length	0	11	12	13	14	15	16	17	6
6. Across Chest	0	27	29	32	35	38	41	43	1
7. Chest Girth	0	76	80	88	96	104	112	116	6
8. Across Back	2	31	33	36	39	42	45	47	9
9. Bust Girth	0	76	81	91	101	111	121	126	10
10.Under Bust	1	66	71	78	85	92	99	104	15
11. Waist Girth	0	60	66	77	88	99	110	116	5
12. Lower Hip Girth	0	91	95	103	111	119	127	131	25
13.Upper Hip Girth	3	80	86	94	102	110	118	124	16
14.Thigh Girth	4	48	52	59	66	73	80	84	5
15.Front Waist Length	0	32	34	38	42	46	50	52	2
16.7th Cervical to Waist	1	31	33	36	39	42	45	47	1
17. Upper Arm Girth	1	24	26	30	34	38	42	44	12
18. Wrist Girth	3	14	15	16	17	18	19	20	4
19. Acromion to Wrist	1	52	54	58	62	66	70	72	0
20.Sidewaist to Knee	4	50	52	56	60	64	68	70	0
21.Sidewaist to Ankle	2	88	91	96	101	106	111	114	0

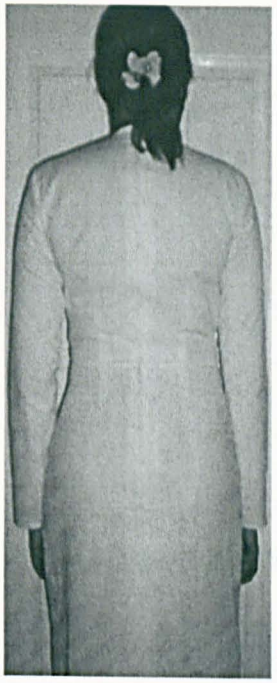
Appendix 8 Fit Assessment Sheet

Code	
Size	
Age Group	
Body Dimensions	**Adjustments**
Neckline Position	
Shoulder Length and Position	
Bust Girth	
Waist Girth	
Waist Position	
Front Waist Length	
Centre Back Length	
Lower Hip Girth	
Upper Arm Girth	
Acromion to Wrist	
Wrist Girth	
Side Waist to Knee	
Side Waist to Ankle	
General Balance	

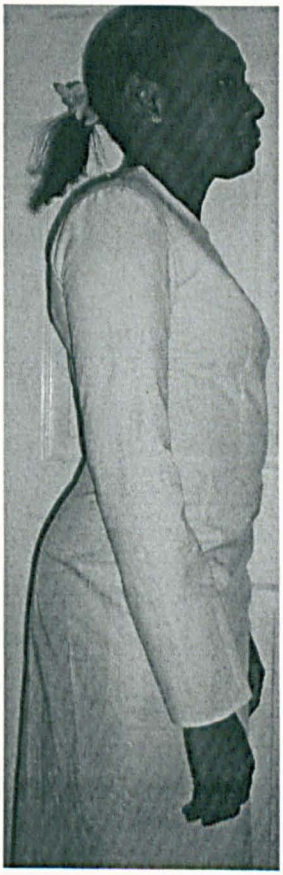
Appendix 9 Trial Garments



Front View



Back View



Side View

Appendix 10 Anthropometric Training Manual

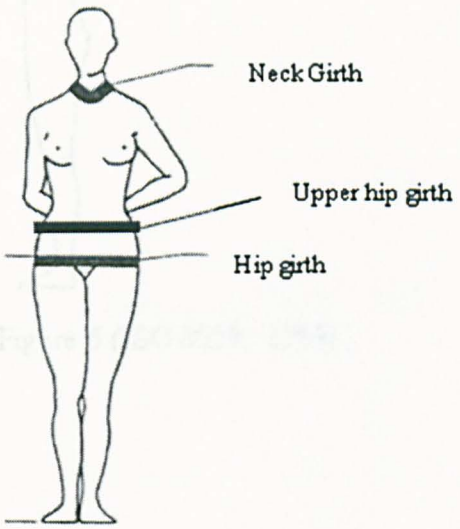


Figure 1 (ISO 8559, 1989)

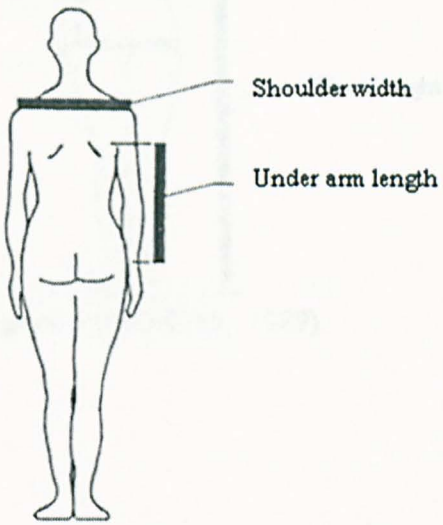


Figure 2 (ISO 8559, 1989)

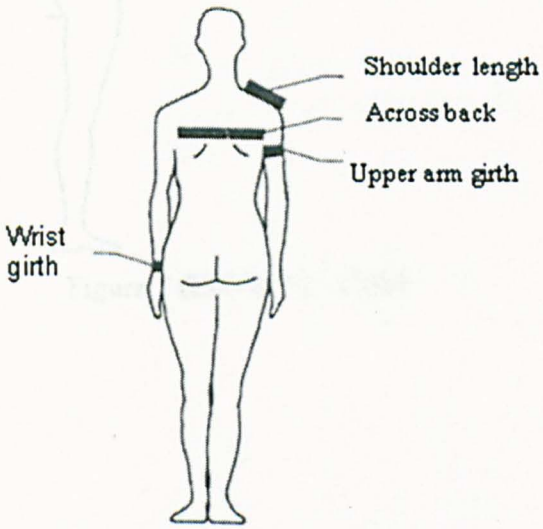
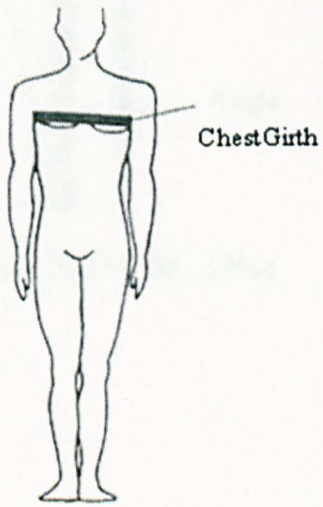


Figure 3 (ISO 8559, 1989)



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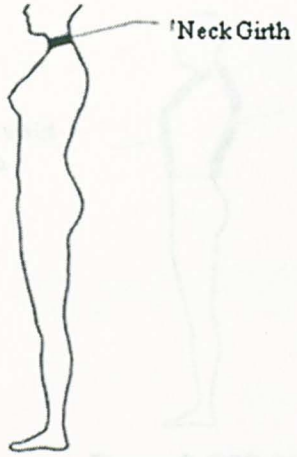
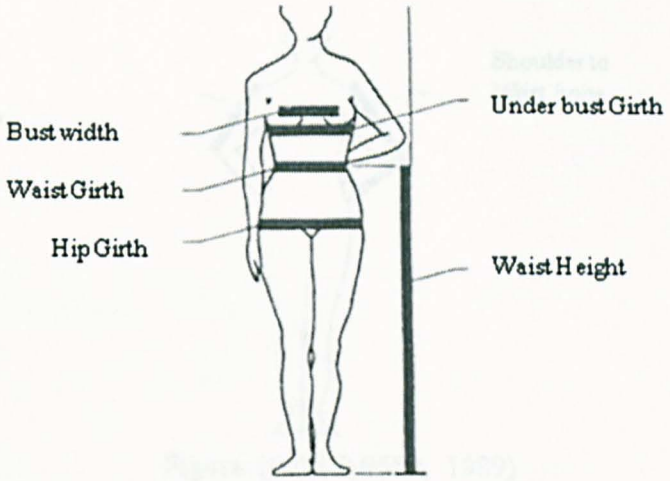


Figure 5 (ISO 8559, 1989)



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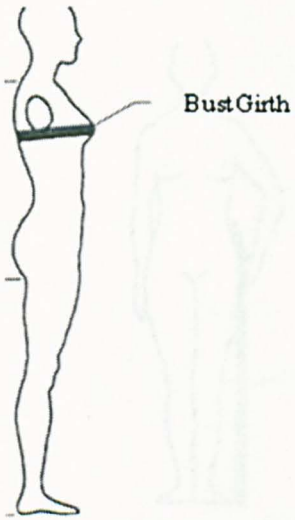

Figure 7 (ISO 8559, 1989)

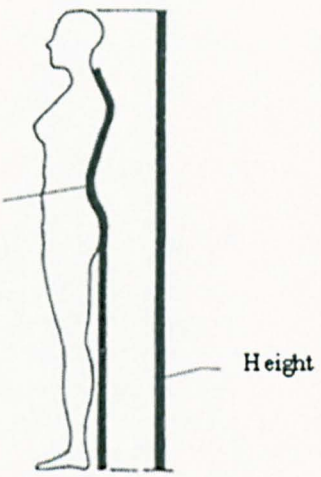

Figure 8 (ISO 8559, 1989)

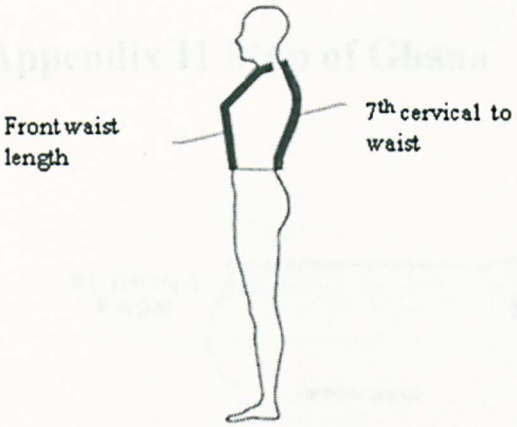

Figure 9 (ISO 8559, 1989)

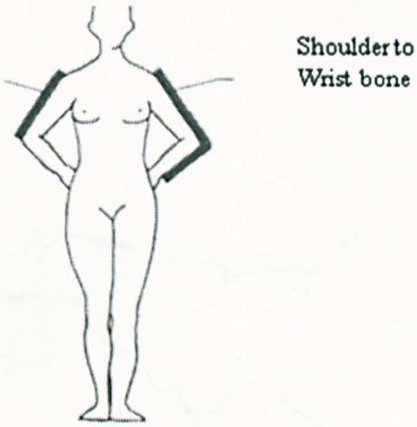

Figure 10 (ISO 8559, 1989)

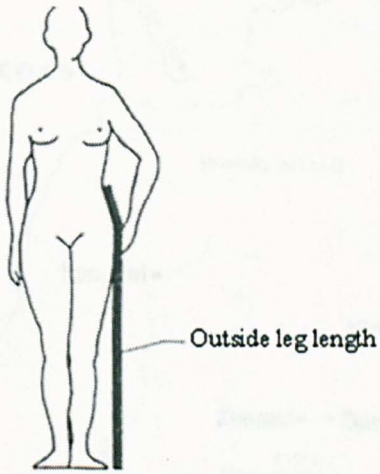

Figure 11 (ISO 8559, 1989)

Appendix 11 Map of Ghana

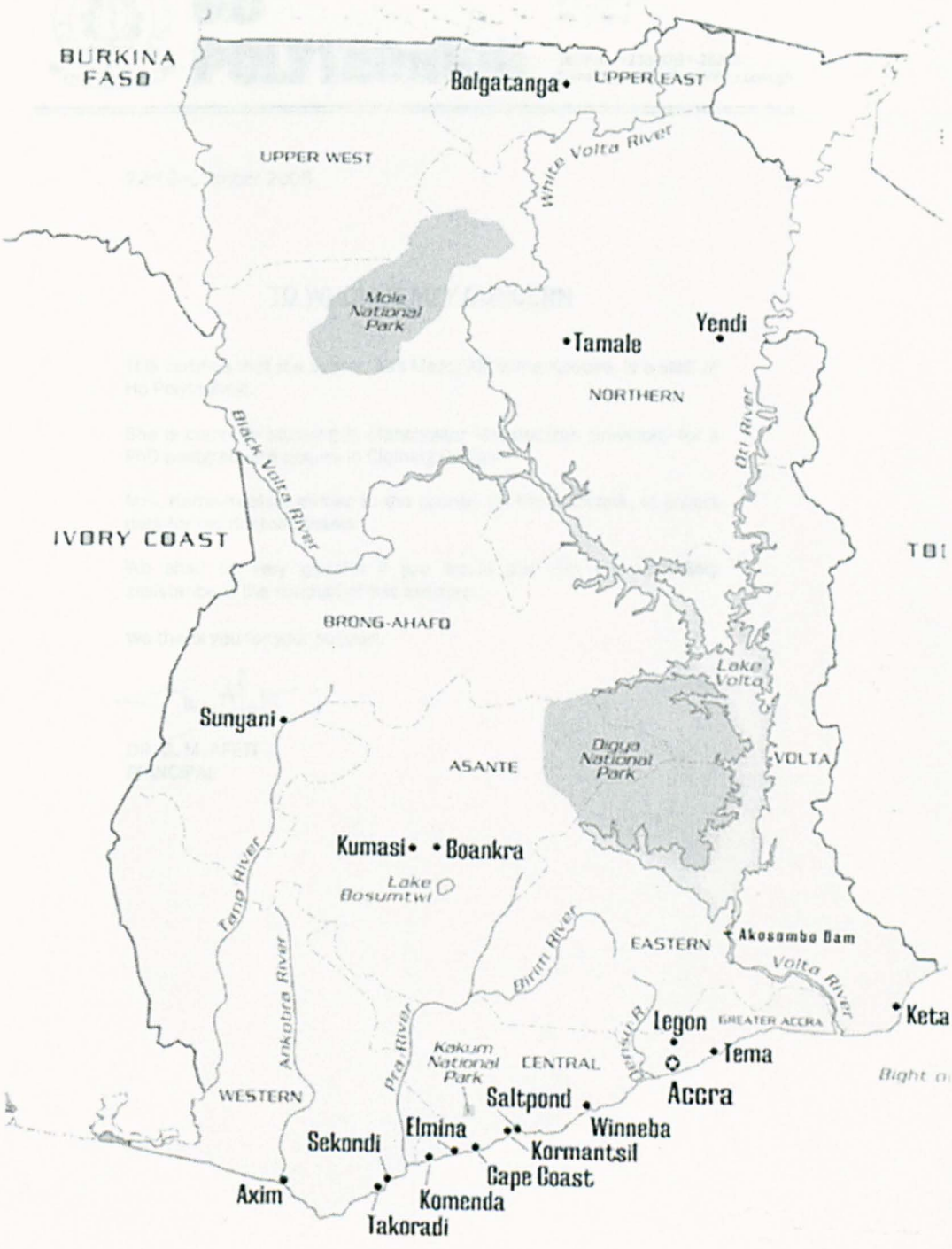

Figure1: Map of Ghana
(Pierre, 2004)

Appendix 12 Approval for Fieldwork

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22nd September 2005

TO WHOM IT MAY CONCERN

This certifies that the bearer, Mrs Mercy Afi Kuma-Kpobee, is a staff of Ho Polytechnic.

She is currently studying in Manchester Metropolitan University for a PhD postgraduate degree in Clothing Design.

Mrs. Kuma-Kpobee arrived in the country for her fieldwork, to collect data for her doctoral thesis.

We shall be very grateful if you would give her the necessary assistance in the conduct of this exercise.

We thank you for your support.

DR. G. M. AFETI
PRINCIPAL

Appendix 13 Published Papers

1. The utilisation of slit and kaba in Ghana. Paper presented at the Ars Textrina International Textiles Conference, Belfast-Northern Ireland. 11th and 12th September 2007.
2. Utilization of traditional dress: the case of Slit and Kaba in Ghana. Paper presented at the 86th Textile Institute World Conference, Hong Kong, 18th-21st November, 2008.