CHAPTER-5
RESEARCH DESIGN AND METHODOLOGY

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This chapter provides an overview of the research design and methodology adopted in this thesis to meet the objective of this research. Several philosophical beliefs of researchers are discussed and the philosophical standpoint of the author is acknowledged. Then, diverse alternatives for research approaches, designs, strategies, methods and time dimension are discussed, and the specific choice made in this study is clarified. Moreover, this chapter elaborates the details of research methodologies in regard to sampling procedures. Data analysis by means of univariate, bivariate and multivariate analysis used for the treatment of data in this study was discussed in detail. Finally, ethical consideration pertaining to data collection and chapter summary were presented.

5.1 Research Philosophy and Approach

Philosophical thinking is vital in social and management sciences as it provides a foundation for designing research. According to Guba and Lincoln (2005) research philosophy encloses a set of beliefs that guide research inquiries. The beliefs and experiences of a researcher somehow influence the way a particular research project is conducted. In particular, the way a researcher views environment surrounding him/her will underlie the choice of which research practices should be used including research approaches, research strategies, etc. These philosophical views are classified as research paradigms. Research philosophy covers the development of knowledge, particularly how the truth is discovered or how the knowledge is created (Saunders, Lewis and Thornhill, 2009). There are several philosophical standpoints that have been criticized and debated among researchers. A clear understanding of different philosophical standpoints is essential for a researcher to clarify his/her fundamental beliefs and to justify particular research practices chosen.
The research philosophy can be categorized under three ways of thinking named as positivism, interpretive and realism (Saunders, Lewis and Thornhill, 2009). These different philosophical assumptions influence the researcher in the research process and in reporting inquiries. Veal (2005) argued that different paradigms can coexist in the same study and complement one another. As cited by Mingers (2003) from the work of Orlikowski and Baroudi (1991) they concluded that the vast majority of information system research adopts a mixed paradigm approach.

Positivism is one of the most dominant philosophical views in management research (Saunders, Lewis and Thornhill, 2009). This view was adopted in this study based on its assumptions on particular social reality, such as the role of MAIS on managerial decisions. This approach assumes that any analysis is based on an objective description and explanation. This approach aims to be precise and factual, using objective measures. Positivism is evaluated empirically by quantitative methods i.e. surveys and experiments and statistical analysis (Easterby-Smith, Golden-Biddle and Locke, 2008). It may also be called scientific, empirical or quantitative research (Malhotra et al., 2006). Quantitative strategy adopted in the questionnaires is always associated with positivist research (Henn, Weinstein and Foard, 2006).

The MAIS role is subjective and multiple as seen by the managers. Therefore biases are present. In that sense, apart from imposing a model of positive reality, views of the reality based on the perception of the participants involved was also considered. This approach argues that people or phenomena cannot be analyzed in such an objective way, because the researcher, context, and social reality affect research outcomes. In this approach, “reality” is “socially constructed and subjective” and is not something for which there is one universal truth (Veal 2005, p.24). This is because it is believed that it is more likely that participant’s experience physical and
social reality in different ways. The study is also interested in gaining some information about the meaning or reasoning behind participant actions in adopting MAIS for example, their knowledge and understanding about MAIS. This information will rely on their explanation or behaviour and therefore critical/interpretive paradigm was also adopted in this study to gain all this information (Veal, 2005).

The present study was not fixated on a single paradigm. This study by combining the two paradigms of research would produce rich and reliable results. A positivist view was taken in the initial stage of the study with quantitative data collection. This was followed by a number of interviews leading to an interpretative analysis in order to gain a deeper understanding of the issues. The next section discusses the appropriateness of the approach selected for this study.

There are mainly two kinds of research approaches: inductive and deductive approaches. Understanding to these approaches is essential to increase the efficiency of the research study. Both the approaches are completely different from each other.

The inductive approach works from specific observations to broader generalizations and theories. Informally, this is sometimes called a bottom-up approach (Trochim, 2006). The researchers may begin with specific observations and measures, to detect patterns and regularities, and then formulate some tentative hypotheses that they can explore. This helps the research to give inductive arguments (Mertens, 2008). In this inductive approach, theory follows specific observations or data findings, which refer to building theory (Bryman, 2008). A general proposition or conclusion is drawn from the basis of observation of particular facts or pieces of evidence and also conclusion explains facts and the facts support the conclusion (Zikmund et al., 2010). The study
of a small sample size of subjects might be appropriate (Saunders, Lewis and Thornhill, 2009).

In contrast, a deductive approach typically moves from the more general to the more specific. Sometimes this is informally called a top-down approach (Trochim, 2006). Researchers might begin by examining theories related to their topic of interest. They then narrow those theories down to more specific research questions or hypotheses that can be tested. Variety of data and information is collected by the researcher to confirm or reject the hypothesis to resolve issue (Gill and Johnson, 2010). Then, the researchers answer questions or confirm hypotheses through a number of research methods, mainly in quantitative ways in order to be able to generalize the findings (Saunders, Lewis and Thornhill, 2009).

These two approaches of reasoning are different ways to conduct research. Inductive reasoning is more open-ended and used to understand new or unknown phenomena. The theory usually follows data and the findings are often difficult to replicate. On the other hand, deductive reasoning is narrower in nature and is concerned with testing or confirming hypotheses. The theory will be developed through confirmed or rejected hypotheses and the findings can be replicable. In short, the difference between two approaches is that one is building the theory (inductive) while the other one is testing the theory (deductive) (Saunders, Lewis and Thornhill, 2009).

The selection of approach depends on the extent to which existing knowledge and theories are available related to the topic of interest. If prior knowledge and theories exist, a deductive approach is appropriate. On the other hand, if there is no theory to guide the research, then the inductive approach could be selected. For this reason, deductive process is more suitable as the research would be moving from the general
to the particular situations of the company. A number of research hypotheses are formulated and will be tested in order to understand the role of MAIS on managerial decisions in medium and large scale printing companies in Ethiopia.

5.2 Research Design

Subsequent to establishing research philosophy and approach, the development of an appropriate research design is pursued. The research design is the plan of the methods and procedures to be implemented for the collection of data. The purpose is to answer the research problem, the research objectives and the hypotheses. The research design provides “a framework for the collection and analysis of data” as explained by Bryman (2008). Yin (2003) points out that research design is a logical sequence that connects the empirical data to a study’s initial research questions and, ultimately, to its conclusion. An appropriate research design is essential as it determines the type of data, data collection technique, the sampling methodology, the schedule and the budget (Hair et al., 2011).

A research design provides the basic direction for carrying out the research. One popular classification of research design is in terms of the fundamental objective of the research: exploratory research, descriptive research and explanatory (causal) research (Saunders, Lewis and Thornhill, 2009; Hair et al., 2011). These categories differ in several aspects including research purpose, the way research questions or hypotheses are formulated, and the way data are collected. The following section describes more details of each type of research design.

5.2.1 Exploratory research

This type of research is used when a researcher has not enough knowledge about the topic and the meaning of the study could not be understood fully. In essence,
exploratory research is used to have better opinions about researching for the study (Babbie, 2011). The major emphasis of exploratory research is on the discovery of ideas and insights (Saunders, Lewis and Thornhill, 2009). It allows the researcher to familiarize him/herself with the problem or concept to be studied, and perhaps generate hypotheses to be tested (Golafshani, 2003, p.597). Generally speaking, Researchers used exploratory research when little is known about the topic and previous theories or ideas do not apply.

The exploratory research could be conducted through a number of techniques such as literature review, discussing or talking to experts in the field of study or focus group and case study. Most exploratory studies are done for three purposes: (1) to satisfy the researcher’s curiosity and desire for better understanding, (2) to test the feasibility of undertaking a more extensive study, and (3) to develop the methods to be employed in any subsequent study (Babbie, 2011). Having some primary knowledge of the subject matter by an exploratory study; helps in developing the scales for the survey instrument in the subsequent descriptive research.

5.2.2 Descriptive research
The researcher conducts descriptive research in order to identify present and past state of events (Rubin et al., 2010). In general, things are described by providing measures of an event or activity and descriptive research often accomplishes this by using descriptive statistics. These include frequency counts (how many), measures of central tendency (mean or mode), and a measure of variation (standard deviation) (Hair et al., 2011). The researcher observes and then describes what was observed (Babbie, 2011).
This type of research design is more rigid, preplanned and structured, and is typically based on a large sample (Hair et al., 2011). It is typically concerned with determining the frequency with which something occurs or the relationship between two variables (Churchill and Iacobucci, 2009). Initial tentative or speculative hypotheses often exist to guide the project. The relationships studied will not be causal in nature, but they still have utility in prediction (Aaker, Kumar and Day, 2004). Techniques often used for this type of research include: sample surveys, true panel, omnibus panel, and longitudinal study.

5.2.3 Explanatory (causal) research

The focus of this type of research is on studying a situation or a problem in order to explain the relationships among variables (Saunders, Lewis and Thornhill, 2009). It is concerned with determining cause-and-effect relationships, which are studied via experiments (Zikmund et al., 2010). Explanatory research aims to develop precise theory that can be used to definitively explain the phenomena, which leads to the generalization from the research. Does a change in one event bring about a corresponding change in another event? This design is the most intricate, often takes a long time from planning to execution, and can be very expensive (Hair et al., 2011).

This type of research is typically conducted through laboratory and field experiments. Hair et al. (2011) suggest that there are four conditions researchers look for in testing cause-and-effect relationships: (1) time sequence-the cause must occur before the effect, (2) covariance-a change in the cause is associated with a change in the effect, (3) non-spurious association-the relationship is true and not really due to something else that just happens to affect both the cause and effect, this requires that other potential causes be controlled or eliminated, and (4) theoretical support-a logical
explanation exists for why the cause and effect relationship exists. Figure 5.1 summarizes the main uses and types of the three research designs.

**Figure 5.1: Overview of Three Research Designs**

<table>
<thead>
<tr>
<th>Uses</th>
<th>Types</th>
</tr>
</thead>
</table>
| **Exploratory Research** | • Formulate problems more precisely  
  • Develop hypotheses  
  • Establish priorities for research  
  • Eliminate impractical ideas  
  • Clarify concepts |
| **Descriptive Research** | • Describe segment characteristics  
  • Estimate proportion of people who behave in a certain way  
  • Make specific predictions |
| **Causal Research** | • Provide evidence regarding causal relationships by means of:  
  - Concomitant variation  
  - Time order in which variables occur  
  - Elimination of other explanations  
  • Literature search  
  • Experience survey  
  • Focus groups  
  • Interviews  
  • Project tests  
  • Ethnographies  
| **Types** | • Longitudinal study  
  • Panel  
  • Sample survey  
  • Laboratory experiment  
  • Field experiment |

Source: Adapted from Churchill and Iacobucci (2009)

**5.2.4 Interrelation of research designs**

There are distinctions among exploratory, descriptive, and explanatory research designs. Nonetheless, they have complementary roles in many research projects. The distinctions are not absolute because any research project is likely to serve several purposes and therefore require more than one research design. According to Churchill and Iacobucci (2009), the three research designs are not totally independent. There is a connection and overlap between these research designs (see Figure 5.2).
A researcher may begin with an exploratory study which will provide essential background information needed preceding a descriptive study. In turn, information obtained from a descriptive study may help the researcher design a causal experiment. This interrelationship, however, does not necessarily mean that all research must begin with an exploratory study. Instead, the beginning depends on whether researchers can be sufficiently specific in formulating the problem. Both descriptive and explanatory studies can be a starting point too, but most research projects often begin with exploratory study (Churchill and Iacobucci, 2009).

In this study, exploratory and descriptive research designs are applied. The study begins with an extensive review of literature about management accounting; cost terms, concepts, classifications and methods; decision making and the role of management accountant; use of management accounting information; and MAIS to understand better the current phenomena and to narrow the research topic. The scope of the study is then refined, leading to specific research question. Next, a number of hypotheses are developed based on previous similar studies. This process produces 14 hypotheses. The descriptive study is then used to test the hypotheses and describe the details of event.
5.3 Research Strategy

Selecting alternative strategies of inquiry follows the choice of research design. The research strategy refers to the procedure applied to meet research aim and also answer research questions that have been set (Saunders, Lewis and Thornhill, 2009). A number of research strategies exist and can be used for exploratory, descriptive, and explanatory research (Yin 2003). The choice of research strategy is guided by the research questions and objectives, the extent of existing knowledge, the amount of time and other available resources as well as the researcher’s philosophical underpinning (Saunders, Lewis and Thornhill, 2009). It should be noted that no particular research strategy is inherently superior or inferior to another. Each has its own strengths and weaknesses for any particular research situation. In addition, research strategies can be used either jointly or separately in any research project. There are several research procedures that can be labeled as research strategies including experiment, survey, action research, case study, actor-network theory, grounded theory, ethnography, narrative analysis, and discourse analysis. In this study, the survey strategy was utilized but initiated by interviews.

The survey research strategy is the most popular and common strategy for social research, including business disciplines (Saunders, Lewis and Thornhill, 2009). This strategy can be used as a means of gathering quantitative data to answer ‘who,’ ‘what,’ ‘where,’ and ‘how’ questions and is mainly used in descriptive and exploratory research. This strategy is generally associated with the deductive research approach. In addition, it allows researchers to collect large amount of data from a sample of individuals to make some inference about the wider population. Data are collected in a standardized form. This is usually done by means of a questionnaire. The data can be easily compared and analyzed using various statistical techniques.
Survey is usually the preferred research strategy for researchers who are interested in collecting original data to describe a population that is too large to observe directly. In more detail, a survey strategy provides researchers more control over the research process, and it is possible to generate findings that are representative of the whole population at a lower cost than collecting the data for the whole population (Saunders, Lewis and Thornhill, 2009). In this research strategy, questionnaire construction and sampling procedures should be seriously considered because the better they are constructed; the more reliable and valid the data is obtained. The quality of respondents and the questions asked affect the research findings, which leads to more accurate research generalizations.

Moreover, the study is grounded in exploratory and descriptive research designs. Even though it is possible to apply other research strategies for exploratory and descriptive research, the survey is a common practical research strategy available to measure awareness, concepts, and perceptions from a large population as compared to other research strategies. The findings from the survey are typically replicable and are based on statistical probability. This strategy has three main strengths, namely it is particularly useful in describing the characteristics of a large population; it makes large sample feasible; and standardized questionnaires have an important strength in regard to measurement generally (Babbie, 2011).

Consequently, the survey research strategy is selected and applied to carry out this study. Other reasons why the survey strategy was used in this study included the cost of the survey, the duration of the survey and the time-value of information. The survey strategy comprised the following steps: developing the questionnaire; designing a sample plan; collecting data; and analysis of the data. These issues are discussed in subsequent sections.
5.4 Research Method and Time Dimension

5.4.1 Research method

Research methods influence the researcher in the collection of data from its various sources (Myers, 1997). The nature of research can be either quantitative or qualitative. Both methods are widely used in social research including business research. The major distinction between quantitative and qualitative is the different focus on numerical data and non-numerical data (Babbie, 2011; Saunders, Lewis and Thornhill, 2009).

A quantitative research is a data collection method that generates or uses numerical data (Jonker and Pennink, 2010). The essence of the quantitative research is to divide things simply in order that the researcher can plan statistically. In contrast, qualitative research is designed to find answers and to explore the topic question that has been researched (Cottrell and McKenzie, 2011). Qualitative research construct roughly experimental understanding (Stake, 2010). The researchers may need the qualitative research, if they can not exactly know what they are looking for in the study, therefore researchers should be aware of the importance of the collected data.

Basically, to conduct a quantitative study, researchers are required to have skills such as the ability to develop proper hypotheses, test them with proper statistical techniques, and interpret statistical information into descriptive information. For qualitative study, the vital skills needed are the ability to think abstractly and critically, and analyze and make judgment without bias. Nonetheless, the research problems and purposes will determine which method is more appropriate. Ghauri and Gronhaug (2002) suggest that the choice of data collection will depend upon an overall judgment on which type of data is needed for a particular research problem.
Similarly, Creswell (2003) recommends that the choice of research method is based on the research problem, the researcher’s personal experiences, and the audiences whom the researcher reports to.

Because each method has its own strengths and weaknesses, a combination of methods may be used to reduce the limitations and allow researchers to conclude their findings confidently. Practically, one method could be initially used and followed by the other. For instance, a researcher may begin with quantitative method to examine a current trend or facts of phenomena of interest. A qualitative method is then followed to gain more insight and deeper understanding. On the other hand, a researcher may start with qualitative study having a small number of respondents to form the precise direction of research questions. Then, a quantitative study with a large sample follows to generalize the findings. So, it is clear that the choice of selection depends on several factors as suggested by Ghauri and Gronhaug (2002) and Creswell (2003) in the previous paragraph.

Using both quantitative and qualitative methods also increases the validity of the study results (Patton, 1990). Furthermore, the mixed-method approach gives the researcher the opportunity to investigate the research issues from different perspectives and collect a variety of data (Greene and Caracelli, 1997). In addition, using the interview method in addition to a questionnaire survey may add to a more holistic and richer contextual understanding of survey results (Modell, 2005). The qualitative data may provide valuable information that may not be provided by a quantitative technique. Based on these reasons together with the research question and purposes, both quantitative and qualitative research methods are well suited and were eventually chosen.
For this study, the researcher decided to apply both quantitative and partially qualitative approaches to collect and analyze data from a sample of medium and large scale printing companies in Ethiopia. A questionnaire was developed to collect data to empirically test the hypotheses of this thesis and to describe the role of MAIS on managerial decisions. The qualitative method gives the researcher the opportunity to explain the issues rather than just measuring their attributes (Murry, 2003). Thus, the qualitative approach was also used to collect more data in respect to the objectives of the study in order to add new information to this thesis and to minimize the disadvantages of a single research method.

5.4.2 Research time dimension

According to the research time dimension of this study, it is theoretically possible to choose between a cross-sectional and a longitudinal study. Cross-sectional study is based on observations of a sample, population, or phenomenon that are made at a single point in time (Babbie, 2011). The cross-sectional study is also referred to as a sample survey, that is, selected individuals are asked to respond to a set of standardized and structured questions about what they think, feel and do (Hair et al., 2011). This type of study provides a snapshot of the phenomenon at a particular time (Saunders, Lewis and Thornhill, 2009). Most research projects, especially in business, are cross sectional studies because they often face a certain level of constraint, e.g. time, budget, staff, and resource allocation.

On the other hand, longitudinal study is a study design involving the collection of data at different points of time (Babbie, 2011). This type of study is mainly intended to answer the question of ‘Is there any change over a period of time?’ In particular, data collected at successive points in time are compared to see if change occurs. Depending on the research questions and purposes, researchers may want to collect
data at two different points in time or more than two. Nevertheless, it should be noted that subsequently collected data do not necessarily come from the same sample group that provided the original collected data.

Based upon the literature review, most studies in these areas were conducted through cross-sectional time dimension. That is it involves the investigation of particular event or situation at a particular point of time. Therefore, this study is set to describe the role of MAIS on managerial decisions in the medium and large scale printing companies, not over a period of time. This objective signifies that a cross-sectional type is more suitable, so it is therefore applied for this study. In addition, there is also a time constraint in PhD study. A cross-sectional study is more appropriate than longitudinal study.

5.5 Sampling Procedure

For some research, it might be possible to collect and analyze data from every possible case, element, or member of the whole interested population if such research focuses on a small group. However, most research needs to employ sampling procedures because the group of interest is typically large, containing too many cases, elements, or members which make it impossible to collect data from all of them. The present study uses a survey research strategy to answer the research question and fulfill the research purposes. In particular, it seeks to develop a comprehensive research framework and empirically examine the role of MAIS on managerial decisions by using primary data collected from the managers and managerial accountants of printing companies. The sampling consideration is required because the group of interest is large. This section discusses sampling procedures and explains where to collect data. The present study follows five-step procedure for drawing a
sample based on Wilson’s (2006) suggestions. The following diagram illustratively presents the procedure adopted in this thesis. More details follow under each subsection.

**Figure 5.3: Five-step Procedure for Drawing a Sample**

- Define the target population
- Identify the sampling frame
- Select a sampling method
- Determine the sample size
- Collect the data from the sample

Source: Adapted from Wilson (2006)
5.5.1 Sampling population

There are various definitions of the population of a research study. According to Sekaran (2003), population refers to the entire group of people or things of interest that the researcher wishes to investigate. Cooper and Shindler (2006) define population as the total collection of sample elements about which inferences are drawn. It can also be called a ‘study population’ which refers to the entire compilation of elements that the researcher aspire to draw conclusions from (Cooper and Schindler, 2006).

Some research can study all elements of the population of interest, but the ‘study population’ in many cases is often large, making it impossible to include all elements in the study. In the research project, the ‘study population’ should be explicit in order to facilitate the subsequent sample size determination and limit the boundary which a study makes inference to. As suggested by Seymour (1983), the simpler the definition of the target population, the higher the incidence and the easier and less costly it is to find the sample. Because most studies cannot include all elements of the population of interest, a sampling frame needs to be identified.

5.5.2 Sampling frame

When determining a sample, it is essential for a researcher to select sample units or elements (respondents) that will represent the population of interest. A sample frame is a list of population units or elements from which one can select units or elements to be sampled (Diamantopoulos and Schlegelmilch, 2002, p.14). A frame may be a register of industries, a telephone directory or even a map (Martins, Loubser and Vanwyk, 1996). It is the list that researchers can gain access to and use to draw a sample for the research project. It should be noted that the completeness of sampling frame is very important. An incomplete or inaccurate list means that some elements
are excluded and this makes it impossible for every element in the population to have a chance of selection. Consequently, the selected sample may not be representative of the total population (Saunders, Lewis and Thornhill, 2009). Nonetheless, for those who target a large and dynamic population, it is generally impractical to find a complete list of the sampling frame. There is always some degree of incorrectness because the population of interest is too large or regularly changed. “There is rarely a perfect correspondence between the sampling frame and the target population of interest” (Churchill and Iacobucci, 2009). Therefore, the researchers should be aware of this issue when generalizing the research findings to the entire population.

According to Martins, Loubser and Vanwyk (1996) a reliable sample frame must meet the following requirements:

- It represents all the elements of the population
- There is no duplication of elements
- It is free from foreign elements

Thus, for the purpose of this study, the sample frame was broadly defined as all medium and large scale printing companies in Ethiopia, because it can be assumed that a systematic management accounting system (MAS) is little used by smaller units (Lukka and Granlund, 1996). For the purpose of this study, the data maintained by ministry of trade and industry of Ethiopia served as a sample frame for the population. This database consists of the names, addresses and contact details of 174 medium and large scale printing companies. The next step involves deciding how to select some elements of the sample population by making use of the sample frame, thus, choosing a sampling method.
5.5.3 Sampling methods

There are two approaches to sampling: probability and non-probability sampling. In probability sampling, all the subsets of the population have a known non-zero chance of being included as a sample unit, whereas in non-probability sampling, certain subsets of the population have little or no chance of being selected for the sample (Blanche and Durrheim, 2002). Probability sampling is often associated with survey and experimental research strategies. All non-probability samples rely on personal judgment somewhere in the process, which implies that such samples derived from non-probability sampling are not necessarily representative of the entire population. Researchers may still be able to generalize from non-probability samples about the population, but not from a statistical standpoint. Non-probability sampling is more generally used in case study research (Churchill and Iacobucci, 2009; Saunders, Lewis and Thornhill, 2009).

![Figure 5.4: Probability and Non-probability Sampling Techniques](image)

Source: Adapted from McDaniel and Gates (2001)

Probability sampling method includes simple random, systematic, stratified, and cluster sampling (Cant, 2003). Non-probability sampling includes convenience,
judgment, quota, snowball and internet sampling (McDaniel and Gates, 2001). Figure 5.4 above presents sampling techniques in probability and non-probability samplings.

Since the present study uses a survey research strategy, probability sampling is more appropriate than non-probability sampling. Aaker, Kumar and Day (2004), state that probability sampling has several advantages over non-probability sampling. First, it permits the researcher to demonstrate the sample’s representativeness. Second, it allows an explicit statement as to how much variation is introduced because a sample is used instead of a census of the population. Finally, it makes possible the more explicit identification of possible biases. Moreover, probability sampling has been widely used in previous studies that have a similar construct to this study. According to Babbe (2011), “Today probability sampling remains the primary method of selecting large representative samples for social research”. Therefore, probability sampling was applied in this study. Four different types of probability sampling methods can be distinguished: simple random sampling, systematic sampling, stratified sampling and cluster sampling. For the purpose of this study, stratified sampling was chosen.

Malhotra (2008) defined stratified sampling as a probability sampling technique that uses a two-step process to partition the population into sub-populations or strata. A simple random or systematic sampling technique is then used to draw samples from each stratum. Consequently, stratified sampling shares many of the advantages and disadvantages of simple random or systematic sampling (Saunders, Lewis and Thornhill, 2009). This technique improves the representativeness of a sample, at least in terms of the stratification variables (Babbie, 2011). In some cases, a list of the sampling frame may already be divided into strata and if systematic sampling is
employed, selected samples are automatically representative according to the proportion of the strata.

Stratified sampling was used in this research as the sample covers a large area of the country. A list of roughly 174 medium and large printing companies was obtained from the ministry of trade and industry of Ethiopia data base. These respondents were then clustered geographically (administrative region), making the population much easier to be sorted out and then analyzed as shown in Table 5.1. This form of sampling is also sometimes referred to as cluster sampling. Typically, for stratified random sampling, the same percentage of participants, not the same number of participants, are drawn from each stratum (Patten, 2004). Respondent companies from each stratum (Administrative region) were randomly selected through the use of the randomize function in Microsoft excel. After selecting a sampling method, the sample size was determined.

5.5.4 Sample size

Sample size refers to how many respondents should be included in the investigation. This is an important consideration for researchers. The sample size affects the quality and generalization of the data. If the sample size is small, the data obtained may not be representative. It could be simply argued that, larger the sample size, the better researchers can generalize to the population. Statisticians have proven that the larger the sample size, the more closely its distribution will be to the normal distribution of the population. However, according to Cant (2003, p.48), issues of resource availability in terms of time, money and personnel, also have an impact on the size of the sample. Factors such as non response also need to be incorporated into the determination of sample size, as well as the value of the information provided by different size samples in relation to their costs.
Theoretically, the size of a sample can be determined either through the use of statistical procedures or through some ad hoc methods. Ad hoc methods are used when a researcher knows from experience what sample size to select, previous similar studies or when there are some constraints (Aaker, Kumar and Day, 2004). The constraints may be issues such as time and available funding. Patten (2004) suggests that a researcher should first consider obtaining an unbiased sample and then seek a relatively large number of participants. Patten (2004) provides a table to recommended sample sizes.

For the purposes of this study, a table of recommended sample sizes (n) for populations (N) with finite sizes developed by Krejcie and Morgan and adapted by Patten (2004), was used to determine estimated sample size. It is clearly seen that lowering the margin of error requires a larger sample size. However, lowering the margin of error is increasing the precision of estimation of the population. For this study, a 95% confidence level and 5% margin of error was selected because it has been used in most studies in business research. According to the table, and for purposes of this study, the researcher used a population size N= 174 medium and large scale printing companies and thus a sample size goal of n=120 medium and large scale printing companies.

For each of the sampled companies (120 medium and large scale printing companies), a questionnaire was distributed to General managers, Marketing managers, Production managers, Finance managers and Managerial accountants. They were chosen as the target respondent as they are believed to represent the major management accounting information system stakeholders within the organization and could be expected to have a better understanding of the information issues within the organization. A total of 600 questionnaires were distributed to managers and managerial accountants.
working in the sampled medium and large scale printing companies in Ethiopia as shown in Table 5.1.

**Table 5.1: Sample on Stratified Basis- Random Selection**

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Number of Companies</th>
<th>Proportion of population</th>
<th>Stratum sample size</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa</td>
<td>137</td>
<td>.79</td>
<td>95</td>
<td>475</td>
</tr>
<tr>
<td>Oromia</td>
<td>12</td>
<td>.07</td>
<td>8</td>
<td>40</td>
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<tr>
<td>Amhara</td>
<td>10</td>
<td>.06</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>SNNP</td>
<td>9</td>
<td>.05</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Tigrai</td>
<td>6</td>
<td>.03</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>174</strong></td>
<td><strong>1.00</strong></td>
<td><strong>120</strong></td>
<td><strong>600</strong></td>
</tr>
</tbody>
</table>

The next section will explain the data collection methods used to collect the data from the respondents.

**5.5.5 Data collection**

Data collection refers to the way in which the data was captured in the field setting. Different techniques such as observation; structured, semi-structured, in-depth and group interviews; questionnaires and secondary data can be applied in the process for data gathering (Saunders, Lewis and Thornhill, 2009). Each data collection method has its advantages and disadvantages. The information required for this research was collected mainly from the primary sources and even from secondary sources. The primary source consists of the data analyzed from questionnaire and interviews. And magazines, brochures, newspaper, company financial manuals, conference proceedings, government publications, academic journals, books, and the World-Wide Web (internet) are used as secondary sources. The survey methodology is finally put into practice and the field workers complete the research instruments.
In preparation for data collection a number of formalities had to be met. The approval of the Andhra University (AU) department of commerce and management studies to undertake the work was required. Figure 5.5 above illustrated the data collection procedures taken for this study.
### i) Instrument design - questionnaire

McDaniel and Gates (2001) define a questionnaire as a set of questions designed to generate the data necessary to accomplish the objectives of the research project. It is guided by the research questions and serves as a data collection tool (Punch, 2005). The administration of questionnaires can take several forms in that some questionnaires are mailed while others are distributed by hand to individuals or to a group (McBurney, 1994). Questionnaires are very useful for data collection for sequential research that uses mixed methods. The use of questionnaires ensures greater generalisability of the research findings than can be achieved using other methods. According to Gillham (2000) questionnaires sit towards the structured end of the “verbal data dimension”. This means that the choice of questions asked is important if the research instrument is to adequately address the research objectives and questions.

### Table 5.2: Advantages and Disadvantages of Questionnaires as a Mode of Data Collection

<table>
<thead>
<tr>
<th>Mode of data Collection</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personally/self administered questionnaires</td>
<td>Ability to rapport and motivate respondent. Doubts can be clarified. Less expensive when administered to a group of respondents. High response rate assured. Respondent anonymity is high.</td>
<td>Organizations may be reluctant to give company time for the survey with groups of employees assembled for the purpose.</td>
</tr>
<tr>
<td>Mail questionnaires</td>
<td>Anonymity is high. Wide geographical regions can be reached. Respondents can take more time to respond at convenience. Can be administered electronically if desired.</td>
<td>Response rate is almost always low. A 30% rate is acceptable. Cannot clarify questions. Follow-up procedures for non-response are necessary.</td>
</tr>
</tbody>
</table>

Source: Adapted from Sekaran (2003)

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7 A copy of questionnaire is shown in Appendix 1
In this study, modes of data collection were both self administered and mailed questionnaire. Each of these ways has its advantages and disadvantages. Table 5.2 above outlines the advantages and disadvantages of each type as suggested by Sekaran (2003).

Due to its ability to motivate respondent and high response rate, the current study used 83 percent personally/self administered questionnaire and 17 percent mailed questionnaire. In the process of developing the instrument, there were several variables determined. These variables were classified into five categories: organization’s management accounting information systems, usage level of management accounting techniques, adequacy of accounting employees, costing system and pricing policy, and demography.

Most of the questions were in closed form using a five point Likert-type scale. Respondents were instructed to select the response option that best reflected their positions on each item (Foddy, 1993). Usage level of management accounting techniques, use of MAIS in the organizations, extent of use of accounting data from MAIS, extent of Information characteristics, and uses in support of managerial decisions were all scored on five-point numerical scale from 1=not at all to 5=to a very great extent. Itemized rating scale was also developed for few questions. For example, scale from 1=strongly disagree to 5=strongly agree was used for question as to rate the actual performance on important factors for quality MAIS. There is also similar scale 1=no valued to 5=highly valued was used for question requesting to indicate the rate of professionally standing after using MAIS.

The reason for opting to use the Likert scale was ascribed to its many advantages as reported in the literature. This form of summated scale is one of the most widely used
in the social sciences today. It is simpler to construct and more reliable. The graded response may also give more precise and reliable information about the respondent’s opinion. The written questionnaire (see Appendix 1) consists of 39 questions (in 5 sections). There was a half page empty space at the end of the questionnaire to give respondents an opportunity to express anything else that they would like to add.

There were a total of 600 questionnaires distributed to the general managers, marketing managers, finance heads, production managers and managerial accountants of the sampled printing companies. An overall response rate of 89% was achieved. The survey was conducted between November 2011 and January 2012.

ii) Instrument design – the interview guide (Protocol)\(^8\)

Interviews were conducted in the second phase of the data collection process. Interviews can be conducted either face to face or through other methods such as the telephone or the internet (Sekaran, 2003). A personal interview is a form of direct communication between interviewer and respondent in which the interviewer asks the respondent questions in a face-to-face situation (Zikmund, 2003).

There are three types of interviews. These include: structured, semi-structured and unstructured. This study utilizes a semi-structured interview. Semi-structured interviews enable probing for more information (Barriball and While, 1994). Semi-structured interviews are the most widely used interviewing format for qualitative research. Semi-structured interviews are often the sole data source for a qualitative research project and are usually scheduled in advance at a designated time and location suitable for both the interviewer and interviewee. They are generally

\(^8\) A copy of Interview is shown in Appendix 3
organized around a set of predetermined open-ended questions, with other questions emerging from the dialogue between interviewer and interviewee. Semi-structured in-depth interviews can occur either with an individual or in focus groups. Most commonly they are only conducted once for an individual or group and take between 30 minutes to several hours to complete. The researcher must prepare in advance the main interview questions. The basic research question may well serve as the first interview question, but between 5 and 10 more specific questions are usually developed to delve more deeply into different aspects of the research issue (DiCicco-Bloom and Crabtree, 2006). However, the researcher did his best to ensure the validity and reliability of the interview through a reasonable design and careful procedures to conduct the interview process.

In this study, the interviews were intended to improve the richness of the data already collected from the surveys and to minimize the disadvantages of a single research approach. Semi-structured interviews were conducted with 5 finance managers, 2 marketing managers, and 3 production managers from five printing companies agreed to answer questions which lasted from 30 minutes to 60 minutes. 50 percent of the interviews are finance managers. The financial managers were selected for interviews because their experiences reflected the full scope of issues in this study (Cooper and Schindler, 2006). The interview was made in the month of February, 2012.

**iii) Questionnaire pretest and revision**

According to cooper and Schindler (2006), pre-testing of the questionnaire is the final step toward ultimately improving survey results. Pre-testing is not only an established practice for discovery errors but is also useful for training the research team. The value and the necessity for pre-testing proved necessary because important changes were made to the questionnaire before it was finally accepted as the final
questionnaire. The questionnaire was pretested during July and August 2011. A sample size between 12 and 30 is sufficient for a pilot study (Hunt, Sparkman and Wilcox, 1982). Following the recommendations of Reynolds and Diamantopoulos (1998), a sample of 15 relevant respondents were selected for this study. This sample includes 10 finance managers and 5 managerial accountants. The finance managers and managerial accountants were chosen from 10 printing companies that represent the medium and large scale printing companies in Ethiopia.

A package containing a cover letter, a questionnaire, and a postage-paid reply envelope was sent to 10 printing companies asking the finance managers and managerial accountants of the firm to fill out and return the questionnaire within two weeks. In addition, respondents were asked to freely criticize the wording, meaning, understanding, and formatting of the questionnaire. They were also asked to give contact information if they were willing to give an interview. Thirteen questionnaires were returned within two weeks constituting about 87% of response rate. Four of 13 responses indicated that they were willing to give an interview. The four interviews were conducted over the telephone. Their recommendations were used to revise the questionnaire.

Further, the internal consistency reliability method was employed to verify the reliability of the scales used in the questionnaire. The reliability of a measure refers to the extent to which the measure is free from random error and whether the measure offers consistent measurement across time and across items in the construct (Sekaran, 2003). Hence, the degree of reliability of a measure is based on the consistency of results given by a particular measure (Carmines and Zeller, 1979). Good questions should be reliable in that they should provide consistent measures in comparable situations. That is, when respondents are in comparable situations, they should answer
the questions in the same way (Fowler, 1993). In this step, some items were dropped to increase the reliability of the scale. Unreliable items were excluded in the final version of the questionnaire.

Adjustments were made based on the returned questionnaires and feedback from the respondents. All recommendations were taken into consideration together with the analysis of returned questionnaires. Particularly, the format of the questionnaire was deemed to be good and acceptable for respondents. Moreover, most questions were clear and understandable. They suggested adding more details about the different decisions made by managers in the final version.

Based on the comments from the pilot-test, the questionnaire was modified and a final questionnaire was developed then distributed to 600 respondents in 120 medium and large scale printing companies in Ethiopia. The questions in the final questionnaire as given in Appendix [1] followed a logical flow which was based on the objectives of this study as well as to ensure that the responses obtained are more reliable and valid.

5.6 Data Analysis

The purpose of all analyses is to summarize data so that it is easily understood and provides the answers to our original questions. Data collected during the survey was initially coded into numerical representations, so that a series of statistical analyses could be performed with the help of computer software, namely Statistical Packages for Social Sciences (SPSS) version 16.0 and Microsoft Office Excel 2007. SPSS is the standard within the academic community (Leech, Morgan and Barrett, 2005). It is available in windows format and is relatively straightforward to use.

A range of statistical procedures are adopted to explore the research questions posed and to test the hypotheses. The responses were coded, entered and manipulated using
SPSS to produce descriptive statistics representing relationships among concepts investigated. Initially descriptive analysis was undertaken to explore the results prior to in-depth analysis undertaken to test the hypotheses posed. In identifying suitable analytical techniques statistical textbooks were consulted. These texts suggest and identify appropriate statistics for different types of research questions and research hypotheses (Leech, Morgan and Barrett, 2005; Nardi, 2006).

Most of the data collected adopted a 5 point likert-scale. Responses to several likert items are summed and averaged; they are treated as interval data measuring a latent variable. Each blank questionnaire was uniquely coded to indicate the company, the manager’s functional position and a serial number. This was done so that the respondent could be easily traced where applicable. In addition, to allow SPSS to be used to manipulate the data, appropriate codes were attached to the questions and sub-questions in the questionnaire. The codes were exhaustive, mutually exclusive, and derived from the same classification principle. Alphanumeric codes were used for company name. Numeric codes used for Likert scale questions and sub-questions, and other questions were categorized appropriately. The researcher checked and cleaned the data by examining the coded data for any incorrectly assigned codes and correcting these errors by reviewing the original data (Jennings, 2006). Finally univariate, bivariate and multivariate data analysis were performed.

Univariate data analysis is the analysis of single variable. According to Mouton (2001), descriptive statistics organizes and summarizes the data to render it more

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9 Although there is argument that such treatment can be seen controversial (see, Jamieson, 2004). It also has become common practice to assume the likert-scale categories constitute interval-level measurement.
comprehensible. Descriptive statistics enable the researcher to describe trends in the data and also to determine whether relationships exist between variables.

For this study, the researcher made use of the following descriptive statistics, with a range of aims:

- The calculation of frequencies and percentages expressed as tables and graphs.
- Measurements of central tendency, namely the mean. The mean is the sum of the individual scores in a distribution, divided by the number of scores (McDaniel and Gates, 2001). The mean can be found for ordinal and interval variables.
- Measurements of dispersion of the data using the standard deviation (SD) of the measurements. The SD is a measure of how much, on average, the scores in a distribution deviate from the mean score (Vogt, 2005). This provides a reflection of how homogeneous or heterogeneous a population is. The SD further provides an indication of the average distance from the mean (Vogt, 2005). A low SD would mean that most observations cluster around the mean. A high SD would indicate considerable variation in the responses.

The analysis of two variables, or bivariate analysis, was required for this study. Correlations as instruments of bivariate analysis and testing the significance of a difference between means were used.

Cross-tabulations and χ² tests were conducted to indicate whether there were any statistically significant relationships (Huysamen et al., 2005). Cross-tabulation is the process of simultaneously treating (counting) two or more variables in the study. This process categorizes the number of respondents who have responded to two or more questions consecutively (Hair et al., 2011). Chi-square indicates whether or not a
relation exists between or among variables. Most of the statistical tests report a significance level (or one can be obtained). Difficulty is sometimes experienced in interpreting these values. Generally, the smaller the significance level reported, the more conclusive the results. Social scientists usually establish a cut-off point at $p=0.05$, i.e. the 5% level. This implies that there is a 5% chance that the results obtained were a result of chance (or sampling error).

Analysis of variance (ANOVA), and Z-test was employed to test the theoretical framework on which the study was based so as to determine whether there were significant relationships, or differences among group mean totals, item mean scores, and independent variables (Jennings, 2006).

For the analysis of multivariate data, a range of more complex parametric tests was conducted on the data. Item mean analysis as a multivariate grouping procedure were applied to data. Item analysis was conducted to determine the internal consistency and reliability of each individual item as well as each subscale. Cronbach’s Alpha test was also used to test internal reliability. Analysis of the survey data using these analytical tools is presented in Chapter 6.

5.7 Ethical Consideration

In the process of data collection, ethics were a major consideration. Ethical considerations guided the researcher to ensure that the research results are reliable, credible and impartial. This research accommodated the responsibilities to protect the interests of the sponsor, the survey respondents and users. The sponsors of this research were NORAD III project of Mekelle University in Ethiopia, which hold their own code of research ethics to which I am committed to adhere as University Industry Community Linkage Directorate Office, Ref. No: UICL-137-06-2011.
With regards to the survey respondents, the respondents were assured of confidentiality concerning their personal information. Neither department names nor identification of individuals were used by anyone other than researcher. The survey packages included a cover letter asking for their cooperation and a copy of the questionnaire. The cover letter explained the objectives of the study, a guarantee of the confidentiality of the respondent, an estimate of time for the respondent to complete the questionnaire. I also thanked the respondents for their time and effort in participating in the study. The cover letter includes the name and contact information of the researcher and signed by the researcher. In an attempt to increase respondents’ cooperation with the survey, a copy of approval letter from Adviser, International students Affairs of Andhra University were also included in the survey packages.

The potential users of this research study are not limited to printing industry but also to other industries in Ethiopia who may be interested to understand the role of MAIS on managerial decisions. Specifically, the companies that have greatly helped this survey shall be treated with utmost care and respect to their reputation. Their identities will not be revealed and data obtained will be kept strictly confidential. Furthermore, the purpose of this study was explained to them and they will be informed of the findings if they so request later. All the quoted statements of other authors are cited using Harvard style of referencing. In acknowledgement, I thanked everybody who gave enormous support to complete the thesis.

**5.8 Chapter Summary**

This chapter presents the research design and methodology applied in this study. Several philosophical beliefs of researchers are discussed. The philosophical standpoint of the researcher falls into the territory of positivism and interpretive. The
deductive research approach is applied and the study is designed within exploratory and descriptive research categories. A survey research strategy was chosen and conducted by using both self-administered and mailed questionnaires to collect quantitative data at a single point of time, cross-sectional. Moreover, this chapter elaborates details of research methodologies in regard to sampling procedures and questionnaire development.

The sampling procedure was done in three steps. First, the sampling population was identified. Medium and large scale printing companies in Ethiopia were selected to serve as the sampling population. Second, the database from the ministry of trade and industry in Ethiopia was chosen as a sampling frame. Third, a sample size of 120 medium and large scale printing companies was drawn using a probability sampling of stratified random sampling technique.

Both the self-administered and mailed questionnaire was developed for data collection in three stages. First, a number of questions were developed based on previous similar studies and relevant literature in accordance with the hypotheses proposed in Chapter One. Second, a questionnaire pretest was conducted to determine the accuracy and consistency of the responses. Last, the reliability and validity of the questions were examined. Revision was based on feedback from interviews and statistical analysis. When the questionnaire was ready, a package containing a cover letter, a questionnaire, and a postage-paid reply envelope was sent out to 600 managers and managerial accountants working in the sampled medium and large scale printing companies in Ethiopia. The interview was also intended to improve the richness of the data already collected from the survey.
The collected data are coded and analyzed by using statistical software program, SPSS version 16.0 and Microsoft Office Excel 2007. Univariate, bivariate and multivariate statistics were used for data analysis. The major statistical techniques used in the study include $\chi^2$ test, Z-test, and ANOVA. Moreover, descriptive statistics are used as well to describe the basic features of the data in the study. Lastly, ethical considerations pertaining to data collection were presented.