

**FACTORS INFLUENCING ENVIRONMENTAL  
MANAGEMENT ACCOUNTING ADOPTION  
IN OIL AND MANUFACTURING FIRMS  
IN LIBYA**

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ACCOUNTING ADOPTION IN OIL AND MANUFACTURING  
FIRMS IN LIBYA**

**By**

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**Thesis Submitted to  
Othman Yeop Abdullah Graduate School of Business,  
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## ABSTRACT

This study was conducted to examine the factors that influenced Environmental Management Accounting (EMA) adoption. Specifically, it investigated the influence of the dominant factors in the organizational, environmental and technological contexts on firms' intentions to adopt EMA. To achieve this objective, eight hypotheses were formulated, with information from previous research and the TOE framework, the TAM model, the contingency theory, the institutional theory, the legitimacy theory, the stakeholder theory and diffusion of the innovation theory. In order to examine these hypotheses, data were collected from financial directors and environmental managers in the oil and the manufacturing firms in Libya, who constituted the sample of this research, by using a researcher-administered questionnaire. A total of 202 usable questionnaires were collected and the data were subjected to tests of variances, factor analysis, correlations and multiple regression. The results revealed that age, education level and tenure in position were among the influential factors on firms' intention to adopt EMA. The results also showed that Libyan firms in the selected industries were dominated by defender strategy and hierarchy culture, which favoured a centralized management style. However, these practices had a negative influence on firms' intention to adopt EMA. Furthermore, the results also revealed that organizational, environmental and technological variables significantly influenced firms' intention to adopt EMA. This study has made useful contributions to current knowledge by providing more explanations on EMA adoption in an unexplored context, and providing further insights into factors that facilitate and impede the adoption of EMA practices. The present study has also filled the gap in the EMA literature by developing a theoretical framework to assess the relationships between the factors within the organizational, environmental, and technological contexts and the intention to adopt EMA. To conclude, this study has provided important insights into the factors that influence the acceptance and adoption of EMA in general, and specifically in Libya. More importantly, this study has opened up possibilities for further research into EMA adoption in Libya and other developing countries, and worldwide.

**Keywords:** Environmental Management Accounting, Adoption, Environmental costs, Environmental impacts, Libya, Oil and Manufacturing Sectors.

## ABSTRAK

Kajian ini dijalankan untuk mengkaji faktor-faktor yang mempengaruhi penggunaan Perakaunan Pengurusan Alam Sekitar atau *Environmental Management Accounting* (EMA). Secara khususnya, ia mengkaji pengaruh faktor-faktor dominan dalam konteks organisasi, alam sekitar dan teknologi ke atas hasrat firma-firma untuk menggunakan EMA. Bagi mencapai objektif ini, lapan hipotesis telah dirumuskan dengan mengguna pakai maklumat daripada penyelidikan sebelumnya dan kerangka kerja TOE, model TAM, teori kontingensi, teori institusi, teori kesahihan, teori pihak berkepentingan dan teori penyebaran inovasi. Untuk mengkaji semua hipotesis ini, data telah dikumpulkan daripada pengarah-pengarah kewangan dan pengurus-pengurus alam sekitar di firma-firma minyak dan pengilangan di Libya dengan menggunakan kaedah soal-selidik yang dikendalikan oleh pengkaji. Sebanyak 202 soal-selidik telah dikumpulkan dan data diambil daripada ujian-ujian varian, analisis faktor, korelasi dan regresi pelbagai. Hasilnya telah menunjukkan bahawa faktor umur, tahap pendidikan dan tempoh dalam jawatan menjadi antara faktor-faktor penting ke atas hasrat firma menggunakan EMA. Keputusan menunjukkan bahawa firma-firma di Libya dalam industri-industri terpilih didominasi oleh strategi pertahanan dan budaya hierarki yang memihak kepada stail atau gaya pentadbiran berpusat. Namun demikian, amalan-amalan ini meninggalkan pengaruh yang negatif terhadap hasrat firma untuk menggunakan EMA. Tambahan pula, keputusan juga menunjukkan bahawa pembolehubah-pembolehubah organisasi, alam sekitar dan teknologi mempengaruhi hasrat firma menggunakan EMA dengan ketara sekali. Kajian ini telah membuat sumbangan yang berguna kepada pengetahuan semasa dengan memberikan lebih banyak penjelasan tentang penggunaan EMA dalam satu konteks yang belum diterokai. Serta memberikan satu perspektif yang lebih terperinci ke atas faktor-faktor yang membantu dan menghalang penggunaan amalan-amalan EMA. Kajian semasa juga telah merapatkan jurang dalam literatur EMA dengan membangunkan satu kerangka kerja teoretikal untuk menilai hubungan di antara faktor-faktor dalam konteks organisasi, alam sekitar dan teknologi serta hasrat untuk menggunakan EMA. Kesimpulannya, kajian ini telah memberikan dapatan penting tentang faktor-faktor yang mempengaruhi penerimaan dan penggunaan EMA secara umum, dan penggunaannya di Libya khususnya. Kajian ini telah membuka ruang yang lebih luas untuk kajian lebih lanjut tentang penggunaan EMA di Libya dan negara-negara membangun yang lain di seluruh dunia.

**Kata Kunci:** Penggunaan Perakaunan Pengurusan Alam Sekitar, Kos alam sekitar, Impak alam sekitar, Libya, Sektor Minyak dan Pengilangan.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Introduction

This chapter provides the outline of this study. It describes the research background, states the problem, presents the research questions, lists the research objectives, highlights the significance of the study, defines the scope of the study, and shows the research structure of this study.

### 1.2 Background of the Study

Firms nowadays are striving to make more effective and efficient, and utilizing as many resources as they can to ensure sustainability and growth in the modern market environment. This requires from the firms to extend their efforts and interests to include environmental aspects for the purpose of reducing environmental impacts and improving environmental performance.

There are several environmental practices that include technical and organizational activities such as Environmental Management Accounting (EMA) which can provide to firms the needed information for the purpose of reducing their environmental impacts, improving their both economic and environmental performance, and achieving the sustainability (IFAC, 2005; Jasch, 2006a, 2006b; Sendroiu, *et al.*, 2006).

EMA, an innovation in the accounting field, has been significantly developed during the last two decades (Ferreira , Moulang & Hendro 2010; IFAC, 2005). EMA is defined as an instrument which assists organizations in managing environmental performance, and reporting environmental information to both internal and external stakeholders (Chang, 2007).

Furthermore, the United Nations Division for Sustainable Development (UNSD, 2001) generally uses EMA information for internal organizational calculations and decision making. EMA procedures for internal decision making include physical procedures for material and energy consumption, flows and final disposal, and monetarized procedures for costs, savings and revenues related to activities with potential environmental impact.

According to Gale (2006a) and Jasch (2006a), the increase in the environmental impacts and related costs, as well as the failure of conventional accounting systems in providing required information for reducing environmental impacts and costs has led significantly to the introduction of EMA. Besides, growing interest in related-environmental issues and the support for environmental accounting given by national and international professional bodies, academic researchers and governments in several countries have played a vital role in the development, acceptance and diffusion of the EMA concept and its practices (IFAC, 2005; Jasch, 2006a).

It is argued that, EMA has emerged and developed as a response to widespread criticisms and considerable challenges facing traditional management accounting in order to manage environmental activities (Burritt, Hahn & Schaltegger, 2002; Chang,

2007, 2013; Hopwood, 2009). This view is also supported by Gale (2006b) and Jasch (2006a) who have drawn attention to a growing trend in recent literature that highlights the failure of conventional management accounting systems to provide useful information on the activities related to the environmental performance of organizations.

Researchers have pointed out that most environmental costs are invisible and cannot be identified in conventional accounting systems (Ditz, Ranganathan, Banks & Beloff, 1995). Therefore, it is not possible to distribute these costs accurately in the operations or activities that cause them, leading to the making of incorrect decisions on setting prices of products (e.g. Bartolomeo *et al.*, 1999; Burritt, 2004; Deegan, 2003; IFAC, 2005; UNDSO, 2001). In addition, the majority of the managers do not realize the benefits that can be derived from improving environmental performance and reducing environmental impacts (IFAC, 2005). Therefore, many opportunities to reduce environmental costs and save money are lost (Chang, 2007, 2013).

Researchers argue that managers in many firms typically believe that costs incurred by environmental activities are not important, and many of them do not realize that some costs of production contain an environmental component (Gale, 2006b; Sendriu, Roman, Roman & Manole, 2006; UNDSO, 2001). In a similar vein, Bartolomeo *et al.* (1999) and Beer and Friend (2006) have argued that conventional management accounting systems do not often consider the portion of raw materials that are converted to wastes as environmental costs, leading to incorrect estimations of these costs, that are much lower than actual figures.

It is argued that EMA is not a separate system, but it constitutes added improvements to management accounting, by providing useful information that helps organizations to manage and improve their economic and environmental performance, and achieve sustainability (IFAC, 2005; Jasch, 2006a, 2006b; Sendriou *et al.*, 2006).

Therefore, the adoption and use of EMA can assist the management in identifying environmental costs and providing needed information to improve the economic and environmental performance of organizations as indicated by many researchers (Gale, 2006a; Jasch, 2003, 2006b; Lee, 2012; Scavone, 2006a; Sendriou *et al.*, 2006; UNDSO, 2001). In addition, Gale (2006b) states that EMA can provide needed information to make decisions related to cleaner production, for example, decisions involved in evaluating capital investments and choosing new technologies.

The importance of EMA not only stems from its ability to provide much needed information for the management, but also from its ability to provide information for various external stakeholders such as government institutions, shareholders, investors, banks and insurance firms (Burritt, Herzig & Tadeo, 2009; Staniskis & Stasiskiene, 2006; UNDSO, 2001). In general, both internal and external stakeholders require information about the environmental performance of the organization (IFAC, 2005; Jasch, 2006a; Scavone, 2006a, 2006b; UNDSO, 2000). The organization's management, for example, needs the information on the costs and benefits related to environmental activities to make effective decisions to manage many activities for improved environmental performance.

On the other hand, other parties such as environmental protection agencies seek information about the environmental impacts whilst investors, shareholders and tax authorities are interested in acquiring information on expenditure, assets and liabilities used by organizations to protect the environment (IFAC, 2004; Staniskis & Stasiskiene, 2006; UNDSO, 2000).

Moreover, EMA can contribute to increasing managers' awareness of environmental impacts and benefits that might be reaped through reducing these impacts (Burrill *et al.*, 2009). However, in spite of the importance of EMA and the benefits that can be gained from its adoption, it is noted that the rate of acceptance, adoption and use of EMA within firms are still low in many developing countries including Libya (Burrill, 2004). According to Ferreira *et al.* (2010), organizations can enjoy several benefits through the adoption and use of EMA. These benefits include increase in product margins, improvement in productivity, reduction in costs, increase in customer satisfaction, improvement in reputation, and decision making, as well as increase in demand for green products.

### **1.3 Problem Statement**

Despite the importance and benefits of EMA, there is no evidence on the adoption of EMA within firms in many countries (Burrill, 2004), which raises the question of the willingness or the propensity of the organizations to adopt EMA. This status requires examining the factors that may impact on firms' intention to adopt EMA.

In addition, it seems that many organizations are not aware of the importance of EMA and the benefits that can be enjoyed from its adoption. This issue is clearer in

developing countries including Libya; perhaps more than in developed countries, due to several organizational, environmental and technological factors. (Burritt, 2004; Chang, 2013; Jalaludin, Sulaiman & Ahmad, 2011; Twati, 2007; Viere, Herzig, Schaltegger & Burritt, 2006b). Therefore, EMA has received attention among accounting academic researchers who have conducted investigations and published their research findings regarding EMA practices in many contexts. However, little attention has been devoted to investigating factors that might influence firms' intention to adopt EMA. Limited research has been conducted on the acceptance, adoption and diffusion of EMA (Burritt, 2004; Chang, 2007; Lee, 2012; Rikhardsson, Bennett, Bouma & Schaltegger, 2005).

Previous studies (e.g. Ambe, 2007; Chang, 2007) have highlighted the relationships between limited factors from organizational and environmental contexts and the adoption and use of EMA. However, only few studies have examined these relationships empirically (Burritt, 2004; Ferreira *et al.*, 2010). In addition, to the best of the researcher's knowledge, no comprehensive study has been conducted to examine the relationship between the factors that influence intention to adopt EMA, particularly in developing countries such as Libya.

There is also very limited research that examines the influence of technological factors such as perceived benefits and perceived importance with the intention to adopt EMA. Studies have examined the impact of limited factors in organizational and environmental contexts on the implementation and adoption of EMA within organizations (e.g. Chang, 2007; Ferreira *et al.*, 2010; Frost & Wilmshurst, 2000b;

Greig, Lord & Shanahan, 2006), while the factors from the technological context have been overlooked.

Moreover, Burritt (2004) found that majority of previous studies related to EMA field have been conducted in developed countries and mainly focused on the discussion of EMA concepts, theories, tools, and the importance and/or benefits of EMA (Burritt, 2004; Burritt *et al.*, 2009; Otman & Karlberg, 2007). Relatively little research has been conducted regarding EMA practices and the adoption process in developing countries in general and in Libya in particular.

Libya, a developing country, is facing serious challenges in terms of economic growth and sustainability due to high level of the cost of environmental degradation. Therefore, a lot of work and efforts is required to address environmental issues and improve environmental performance (Burritt, 2004; Burritt *et al.*, 2009; Otman & Karlberg, 2007). Several indicators show that the economic and environmental performance of Libyan firms in different sectors is unsatisfactory due to their impact on environment. For example, the locations of some industrial firms such as cement, steel and iron factories as well as oil refineries, has affected negatively on the environmental condition in Libya (Elabbar, 2008). In addition, the poor utilization of resources in Libyan firms negatively impacted on their expected efficiency level and competitiveness (EGA, 2006; Eltaief, Kamaruddin, Mohamad & Abessi, 2009; Porter, 2007).

On the other hand, International Bank of Reconstruction and Development (IBRD) in 2010 showed that the cost of environmental degradation in Middle East and North



Africa regions range from 2.1% to 7.4% of GDP for different countries and years (IBRD, 2010). In addition, the report of Arab Forum for Environment and Development in 2011 demonstrated that the environmental costs in Libya reach around USD1.7 billion (AFED, 2011). Thus, National Program for Environmental Sanitation is established by Environment General Authority (EGA) in 2006 included an integrated plan for environmental management, and several standards for evaluating economic enterprises and new investments in environmental terms. This program also aims to promote Libya's firms in different sectors to use new and sophisticated techniques in order to reduce their environmental impacts, improve performance and achieve sustainability (EGA, 2006).

In addition, the international conventions on the environment were instrumental in altering Libya's outlook on environmental protection and conservation, and legislation on the protection of the environment in Libya has been passed, for example, Law No 15 of (2003) to protect and improve the environment. The legislation is aimed at reducing and addressing the environmental impacts and controlling, preventing, and abating pollution in different sectors. Hence, there is a critical need to improve environmental performance in different sectors in Libya, and this refers to the need to adopt and use EMA to help firms in Libya to achieve these goals (Burrirt, 2004; IFAC, 2005; Jasch, 2006a, 2006b; Sendriou *et al.*, 2006).

However, according to Burrirt (2004), evidence on the adoption and use of EMA by the firms in Libya is not yet available, as the adoption and implementation of EMA is still at an early stage (Ferreira , Moulang & Hendro 2008; Ferreira *et al.*, 2010; Rikhardsson *et al.*, 2005; Schaltegger, Gibassier & Zvezdov, 2013). Research effort

would require identifying potential factors that may have an impact on the acceptance and intention of organizations to adopt EMA practices in Libya. Hence, it is imperative to investigate the influence of the factors within the organizational, environmental and technological contexts, on the intention to adopt EMA.

Specifically, this study focuses on four dominant factors in the organizational context (business strategy, nature of formalization, organizational culture and top management support). It also focuses on four dominant factors in the environmental context (coercive pressures, and normative pressures, legitimacy considerations and stakeholder pressures) as well as two dominant factors within the technological context (perceived benefits and perceived importance of EMA) discussed in the literature. The research examines these factors in these three contexts that may influence Libyan firms' willingness to adopt EMA by using a framework that allows firms to accept, adopt and implement EMA.

#### **1.4 Research Questions**

Building on the research background and research problem, the purpose of the study is to examine the extent to which organizational, environmental and technological factors affect firms' intention to adopt EMA practices. Generally this study aims to answer the following question:

*What are the effects of the organizational, environmental and technological factors on the intention of firms to adopt environmental management accounting practices in Libya?*

This question is investigated through four research questions, which are presented below:

1. What are the influences of the organizational factors which include business strategy, nature of formalization, organizational culture and top management support on the intention to adopt EMA within firms in Libya?
2. What are the influences of the environmental factors which include coercive pressures, and normative pressures, legitimacy considerations and stakeholder pressures on the intention to adopt EMA within firms in Libya?
3. Do the technological factors which include perceived benefits and perceived importance of EMA mediate the relationships between the organizational factors and the intention to adopt EMA within firms in Libya?
4. Do the technological factors which include perceived benefits and perceived importance of EMA mediate the relationships between the environmental factors and the intention to adopt EMA within firms in Libya?

### **1.5 Research Objectives**

The main objective of this study is to gain a better understanding of the EMA adoption status in the oil and manufacturing sectors in Libya. The study aims to examine the extent of the organizational, environmental and technological factors that influence the intention to adopt EMA. Available literature indicates that these factors can be derived from various contexts. Therefore, this study investigates the influence

of a combination of factors from the technological, organizational and environmental contexts on the intention to adopt EMA. Specifically, the research objectives are:

1. To examine the influences of organizational factors which include business strategy, nature of formalization, organizational culture and top management support on the intention to adopt EMA within firms in Libya.
2. To examine the influences of environmental factors which include coercive pressures, normative pressures, legitimacy considerations and stakeholder pressures on the intention to adopt EMA within firms in Libya.
3. To examine the mediating role of the technological factors which include the perceived benefits and the perceived importance of EMA on the relationships between organizational factors and the intention to adopt EMA within firms in Libya.
4. To examine the mediating role of the technological factors which include the perceived benefits and the perceived importance of EMA on the relationships between environmental factors and the intention to adopt EMA within firms in Libya.

### **1.6 Significance of the Study**

Available literature indicates that EMA adoption and implementation are still in the early stages, and there is a dearth of research in the field of EMA adoption and process in general. There is also a lack of consensus among the researchers on factors

influencing EMA adoption (Ferreira *et al.*, 2008, 2010; Rikhardsson *et al.*, 2005; Schaltegger *et al.*, 2013). Therefore, there is a need to examine the factors that may influence the acceptance, adoption and implementation of in organizations. This view has been supported by a number of researchers (Ambe, 2007; Chang, 2007; Greig *et al.*, 2006). Therefore, the aim of this study is to fill this gap by investigating the potential factors that may significantly influence the process of EMA adoption.

This study is one of the first empirical studies to provide an in-depth analysis of set factors from the organizational, environmental and technological contexts on the intention to adopt EMA. It is hoped that the findings of this study can contribute to the literature on EMA adoption, and extend theoretical knowledge on organizational, innovation and adoption. This study also hopes to contribute to investigations into the mediating role of perceived importance and perceived benefits of EMA on firms' intention to adopt EMA in Libya.

In addition, to the best of the investigator's knowledge, this study is the first to empirically investigate the impact of the nature of formalization and organizational culture, perceived importance and perceived benefits of EMA on the adoption process worldwide within one framework that has grouped such variables from three contexts. It is also among the few empirical studies that have used a questionnaire as the instrument to examine EMA adoption and it may be the first of its kind in the Arabic region.

The literature reveals that limited studies have been conducted in the adoption of EMA in general and in developing countries including Libya, which faces many

environmental challenges. Much work is still needed to encourage the firms to adopt techniques and practices that assist them to manage and improve environmental performance (Burritt, 2004; Burritt *et al.*, 2009; Otman & Karlberg, 2007). Libya provided several initiatives, legislations and efforts for the purpose of environment protection. This study is a step to increase the awareness of accountants and decisions makers in oil and industries firms in Libya on EMA practices and its role in reducing environmental impacts and improving environmental performance.

Finally, the results of this study may be beneficial to several institutions in Libya, such as the National Oil Corporation (NOP), Ministry of Industry, the Investment General Authority (IGA), Environment General Authority (EGA), and other relevant agencies, which have an interest in the environment and sustainability issues in Libya. The information provided in this study may be used to facilitate the acceptance, adoption and implementation of EMA in many organizations.

### **1.7 Scope of the Study**

The current study aims to investigate the relationships between the organizational, environmental and technical factors and firms' intention to adopt EMA practices from the oil and manufacturing sectors and examine the extent of the factors' influence on the intention to adopt EMA practices. The sample is limited to Libyan firms operating in oil and manufacturing sectors listed in the Oil Nation Institution Directory 2012 and Ministry of Industry Directory 2009.

This study focuses on the oil and manufacturing sectors due to the importance of both sectors in the Libyan economy. The firms two sectors considered more sensitive to

environmental issues, usually rely heavily on natural resources (Ahmad, 2004; Ferreira *et al.*, 2010; Frost & Wilmshurst, 2000b), and they traditionally are more concerned with environmental policies and regulations (Klassen & Whybark, 1999). Thus, it is expected that the firms in these industries are more likely to adopt EMA practices in order to identify environmental costs and the benefits that can be gained through reducing environmental impacts, improving and environmental performance. In addition, this study targeted both of the financial managers and environmental managers in these firms due to their participation in the operations, and their vital roles in the decision-making of financial and environmental activities (Christ & Burritt, 2013; Ferreira *et al.*, 2010; Jalaludin *et al.*, 2011).

### **1.8 Structure of the Thesis**

The thesis is structured into five chapters in the following sequence. Chapter One has provided an overview of this research. Chapter Two reviews literature related to EMA in general and especially on the adoption process. Chapter Three describes the research framework of this study, the methodology, the justification and the selection of the research design. Chapter Four presents the results of the data analysis, which include descriptive statistics and multivariate statistics used to test the hypotheses. The last chapter, Chapter Five discusses the findings based on the analysis. It also highlights the main contributions, theoretical implications of the present study and discusses limitations and directions for future research.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter provides a general overview on Environmental Management Accounting (EMA). The development and definitions of EMA and related types of information are discussed. This chapter also highlights the reasons for the emergence of EMA. It reviews previous studies relevant to EMA for understanding what other researchers have found, and it then determines gaps in these studies. Finally, theories related to the process of EMA adoption and use, as well as potential factors that may influence this process are discussed in this chapter.

#### **2.2 Overview of Environmental Management Accounting**

Environmental issues have become one of the interesting issues in recent decades at the national and international levels. Attention has been drawn to soil, water and air pollution; chemical wastes and global warming caused by industrial activities. Generally, all environmental problems are linked to industrialization and economic growth (Li, 2004). Many governments all over the world have long been engaged in formulating policies and instruments - voluntary, regulatory, incentive, cooperative and informational - to address these problems and promote sustainable development (Lin, 2001; UNDSO, 2000). Therefore, companies in many different countries are under pressure to address environmental impacts and provide information related to



their environmental performance (Scavone, 2006a) through accounting theories and practices (Li, 2004).

In the 1970s, the role played by accounting in addressing environmental issues was not clear but in the 1980s, the accounting profession and accountants in general began to play an active role in attempting to solve environmental problems through provision of sufficient information to various stakeholders, and management accounting addressed issues related to the environment (Bouma & Van der Veen, 2002). This period also saw the introduction of many environmental regulations in numerous countries, for example, the United States, Canada and the United Kingdom. Such regulations were influential in environmental accounting and environmental information disclosure. As a result of the increase in the number of environmental regulations, organizations started to develop environmental programs which helped to reduce environmental impacts, cut costs and achieve sustainability (Walley & Whitehead, 1994). Therefore, management accounting was required in evaluating environmental programs by determining costs and benefits related to such programs. This was apparently considered a starting point in the development of EMA. In the early 1990s, Environmental Auditing and Environmental management systems gained momentum as growing interest and attention led to the further development of EMA.

Environmental Auditing recognizes that corporations need to assess environmental impacts caused by their activities as the main step before managing environmental performance (Chang, 2007). Hence, a number of guidelines were issued, such as ISO 14000 series issued by the International Standards Organization in 1996 (Viadiu, Fa & Saizarbitoria, 2006). These standards include the environmental management

systems, environmental performance evaluation, environment-related auditing, environmental labeling, assessment of life-cycle, as well as environmental aspects to products (Li, 2004). These standards also led to the adoption of environmental management systems (EMS) in the 1990s. Management accounting expanded to incorporate monitoring environmental performance (Chang, 2007).

According to Li (2004), the rapid development and the international acceptance of ISO 14001 certification have enhanced the spread of EMA concept around the world. The role of management accounting has become clearer in managing environmental performance since the early 1990s (Gray & Bebbington, 2000; Stone, 1995). Research conducted in different contexts led to EMA development (e.g. Ansari, Bell, Klammer & Lawrence, 1997; Bailey & Soyka, 1996; Bartelmus & Parikh, 1998; Bartolomeo *et al.*, 2000; Bennett & James, 1998a; Boyd, 1998; Ditz *et al.*, 1995; Epstein, 1996; Gray, Bebbington & Walters, 1993; Milne, 1996; Schaltegger & Stinson, 1994; Stone, 1995; Wilmshurst & Frost, 1998). Among the most significant contributions is the identification of numerous concepts and techniques related to EMA, such as environmental costs, environmental reports, and types of EMA information, environmental management and environmental performance indicators.

Furthermore, several studies and experiences of corporations have shown that the environmental costs can be significant and reducing these costs can be profitable through suitable management actions. According to the Environmental Protection Agency in the United States (USEPA) (2000), several industries obtained financial benefits by incorporating environmental accounting into their systems. For example, General Motors Company established a program for reusing the containers with its

suppliers and saved USD12 million by reducing its disposal costs. In addition, Commonwealth Edison Company gained USD 25 million by using its resources more effectively and Andersen company had returns of more than fifty percent by implementing a number of programs which reduced wastes (Beer & Friend, 2006). Ditz *et al.*(1995) reported that the environment-related costs in a number of firms may exceed twenty percent in some cases. For example, the environmental costs amounted to over nineteen percent from the manufacturing costs of an agricultural pesticide at Du Pont Company, and almost twenty two percent of Amoco Oil's Yorktown refinery operating costs, excluding feedstock. Several projects in Europe, especially in the United Kingdom and the Netherlands have obtained similar findings on environment-related costs and financial benefits by reducing the environmental impacts (Bartolomeo *et al.*, 2000). Moreover, several cases have demonstrated that EMA practices can assist businesses to reduce the environmental impacts, costs and liabilities, leading to increased profits (Lawrence & Cerf, 1995; Lober, 1998). Many countries around the world are therefore interested in supporting EMA practices. The first country to promote and support EMA was the United States, which established a formal program for investigating and promoting EMA, and many initiatives related to EMA were launched by the Environmental Protection Agency (EPA) (Burritt, 2004). These initiatives significantly contributed to defining main concepts and terms related to EMA, as well as providing a categorization scheme for identifying environmental costs (UNSD, 2000; USEPA, 1995b).

Environmental Protection Agency in the USA (USEPA), with the collaboration of the Tellus Institute, conducted several activities, including summarizing definitions, developing a model of investments appraisal, developing research into practices in

various manufacturing activities like electroplating, chemicals and other businesses (Bennett & James, 1998b; Graff, Reiskin, White & Bidwell, 1998). In recent years, EMA activities have been seen in other countries, such as Australia, Japan, Austria, Germany and Argentina. According to Schaltegger and Burritt (2000) EMA has received growing attention as a support mechanism for various organizations to identify and manage significant financial consequences shaped by considerable environmental incidents.

Many governments all over the world are currently involved or interested in promoting EMA practices (Burritt, 2004; Li, 2004; UNDSO, 2000, 2001). However, in Libya, EMA has not received any support or attention from the government or professional organizations so far. Several initiatives to support and promote implementation of EMA practices are provided by international governments. For example, the Japanese government provided two initiatives which contributed effectively to the adoption and use of EMA practices in many Japanese companies (Kokubu, 2002).

In addition, some international organizations and professional accounting bodies have encouraged governments to support EMA adoption by organizing workshops, conferences and conducting academic studies. For example, in 1998, the United Nations organized an Expert Working Group to improve the role of the governments in the promotion of EMA, and the *Environmental Management Accounting: Procedures and Principles* was the first publication by this Group. This publication explains the concept of EMA and provides a number of principles for EMA application (UNDSO, 2001). The International Federation of Accountants (IFAC)

(2005) also published the International Guidance Document to guide EMA studies and practices to provide wider access to EMA. Many articles and books have been published about environmental accounting, and these have contributed significantly to the understanding and practice of EMA (IFAC, 2005).

Furthermore, the voluntary acceptance by management in several organizations that wish to deal with environment-related issues and maintain legitimacy also contributed to the practice of EMA. At present, various tools of EMA are available for managers (Burritt *et al.*, 2002; Deegan, 2002; METI, 2002), researchers, policy advisors and business people who are interested in EMA as an important tool for environmental management. Many conferences and workshops have been organized to conduct regular discussion of EMA developments (Burritt, 2004). In fact, the studies related to EMA in various industry sectors and in small and medium companies are growing.

Despite the interest in EMA, very little research is available on EMA in developing countries including Libya, as pointed out by Burritt (2004). Most studies and projects related to EMA have demonstrated that the importance of environment-related costs is likely support the implementation of EMA practices within organizations.

For that reason, most efforts for promoting EMA have focused on explaining the concept, use and applications of EMA, as well as developing several tools to identify the environmental costs within organizations. Thus, the EMA concept and key terms are directly related to environmental accounting, environmental management and environmental costs, which will be discussed in the next section.

## **2.3 Environmental Management Accounting (EMA)**

It is essential to have an overview of the broader term of Environmental Accounting and an understanding of related key terms before discussing the EMA concept. Therefore, the next subsection provides definitions of the main terms: environmental accounting, environmental management accounting, environmental management and environmental costs.

### **2.3.1 Definition of Environmental Accounting**

Environmental accounting is a wide field of accounting used at different accounting levels, such as national accounting level, financial accounting level and management accounting level (Boyd, 1998). Environmental accounting in the broader term aims to provide environmental information to both internal and external stakeholders (Ditz *et al.*, 1995). Environmental accounting could be used to demonstrate the potential benefits of environmental investments to generate profits, and avoid environmental liabilities (Beer & Friend, 2006). In this regard, Gray and Bebbington (2001, p. 7) explain that environmental accounting covers several aspects which include:

- Evaluating potential environment-related liabilities;
- Re-valuating environment-related assets and capital projections;
- Developing accounting information systems in order to include different environmental performance aspects;
- Evaluating investments in environmental terms;
- Analysing costs in several areas, for example, environment protection, wastes and energy;

- Developing new accounting techniques that express environment-related assets, costs and liabilities in both financial and non-financial terms;
- Evaluating environmental programs in terms of costs and benefits.

The main goal of environmental accounting is providing information about environment-related activities in addition to information generated by conventional accounting. In fact, several and varied definitions of environmental accounting were drawn up by a number of researchers (Bennett & James, 2000; Graff *et al.*, 1998; Gray & Bebbington, 2001; Schaltegger & Burritt, 2000; USEPA, 1995b). One of earliest attempts came from USEPA (1995b), that defined environmental accounting as the field that comprises three distinctive contexts: financial accounting, management accounting and national income accounting at several levels - at national, regional and firm levels, and applicable to a product line, a facility, an activity, or a system (Schaltegger & Burritt, 2000). The present research focuses on environmental accounting in firms. The three levels or subsets of environmental accounting are as follows:

- Environmental national accounting focuses on many aspects such as natural resource flows and stocks, as well as environment-related external costs.
- Environmental financial accounting focuses on disclosing environment-related information such as costs related to environmental liabilities and other environment-related costs.
- Environmental management accounting focuses on information on main resources such as information associated with materials, energy and water flows and information related to environmental costs.

Bennett and James (2000, p. 30) further contend that “environmental accounting includes accounting activities on both the national level and firm level, the processing of both financial and non-financial information, and the calculation and use of monetized external damage costs as well as those that are internal to the firm”.

Gauthier and his colleagues (1997, p. 1) argue that environmental accounting is an aspect of accountancy dealing more specifically with environment-related concerns and it enables an organization to engage in data collection and analysis, carry out decision-making, follow-up performance, and accountability of the management on environmental costs and risks.

Graff *et al.* (1998, p. 3) also state that “Environmental Accounting is a broad-based term that refers to the incorporation of environmental costs and information into a variety of accounting practices”. To seek further clarification of this term, Schaltegger and Burritt (2000, p. 30) state that Environmental Accounting represents a branch of accounting which deals with:

- systems, methods, and activities;
- recording, analysis, and reporting
- financial and environmental impacts of a specific economic system

Furthermore, Deegan (2003) also states that Environmental Accounting is a broader term related to the provision of information on environmental performance to stakeholders within and outside the organization. According to Gray *et al.* (1993) Environmental Accounting is a part of the environmental management systems (EMS)



that covers all areas of accounting that might be affected by a company's response to environment-related issues.

Obviously, there are differences among the perspectives regarding what environment accounting is, but arguably, most definitions have agreed on key themes such as stakeholders' requirement for an environmental accounting information system, an association between the financial and environmental performance, the focus on accounting on internal and external costs, and record, analysis, measures of monetary and non-monetary data. Therefore, it can be argued that environmental accounting is a broad term, and information systems can provide important information on the environmental performance of firms to both of management and all stakeholders. The concept of environmental management accounting (EMA) is discussed in the next section.

### **2.3.2 Definitions of EMA**

The literature review explains that environmental management accounting (EMA) is a new tool for environmental management, and it represents an extension of management accounting (IFAC, 2005; UNDSO, 2001). According to Birkin (1996, p. 34), "EMA is a straightforward development of management accountancy". Jasch (2006b) also explains that EMA, as an information system, is not separated from management accounting; however, it simply does better management accounting, and focuses on the flow of material, and consistency of information systems.

IFAC (2005, p. 19), argues that EMA is "the management of environmental and economic performance through development and implementation of appropriate

environment-related accounting systems and practices while this may include reporting and auditing in some companies, environmental management accounting typically involves life-cycle costing, full-cost accounting, benefits assessment, and strategic planning for environmental management”.

A comprehensive definition given by UNDSO (2001) clearly explains both monetary and physical sides related to EMA. EMA is broadly defined as technique to identify, collect, analyse, and use both monetary and physical types of information for internal decision-making:

- Physical information about use, flows, and fates of materials, water and energy including wastes and
- Monetary information about costs, earnings, and savings related to the environment (Jasch, 2006b, p. 1195).

The two last definitions draw attention to EMA as an effective tool within an environmental management area, and the important role EMA plays in managing the issues relevant to the environment. It can also provide two types of information to corporations to help them move towards economic and environmental sustainability, and improve environmental performance (Burritt *et al.*, 2009; IFAC, 2005).

In the available literature, there are different definitions (Burritt *et al.*, 2002; IFAC, 2005; UNDSO, 2001). Some EMA definitions that are frequently used are shown in Table 2.1.

Table 2.1  
*List of EMA Definitions*

Source	Definition
<b>Bennett and James (1998a)</b>	EMA is the generation, analysis and use of financial and non-financial information in order to optimize corporate environmental and economic performance and to achieve sustainable business.
<b>Schaltegger and Burritt (2000)</b>	EMA is defined in a narrower sense to include only the environmentally induced financial aspects of accounting that help managers to make decisions and be accountable for the outcome of their decisions.
<b>Bartolomeo et al. (2000, p. 37)</b>	EMA is the generation, analysis and use of both financial and non-financial information in order to integrate corporate environmental and economic policies, and build sustainable business.
<b>UNSD (2001)</b>	EMA serves as a mechanism to identify and measure the full spectrum of environmental costs of current production processes and the economic benefits of pollution prevention or cleaner processes, and to integrate these costs and benefits into day-to-day business decision-making.
<b>Jasch (2003, p. 668)</b>	EMA represents a combined approach which provides for the transition of data from financial accounting, cost accounting and material flow balances to increase material efficiency, reduce environmental impact and risk and reduce costs of environmental protection.
<b>Bouma and Correlje (2003, p. 259)</b>	EMA can be regarded as a subset of environmental accounting which refers to accounting systems and techniques that provide decision-makers and management with financial and non-financial information about the firm or organization and its environment.
<b>Staniskis and Stasiskiene (2006, p. 1253)</b>	EMA could be one of the most effective instruments to support implementation of CP innovations, environmental management system (EMS), and development of corporate environmental reports and for selecting environmental indicators.

Nevertheless, there are some differences in these EMA definitions in the scope of application. However, most definitions explain that environmental management accounting is a complementary information system to management accounting. It is not a separate system, but improves management accounting.

An important feature of EMA is related to its focus on monetary and physical information management in decision-making in several aspects such as improving the economic and environmental performance, investment appraisal, applying cleaner production projects, achieving the economic and environmental sustainability of organizations (Jasch, 2006b; Sendroiu *et al.*, 2006; UNSD, 2001). More details about the two types of EMA information is discussed in the next section. The

definition given by Bennett and James (1998b) was chosen for the purposes of this study. It highlights the significance of information generated by EMA to improve both financial and environmental performance in an organization. Therefore, it can be argued that EMA is an information system that provides monetary and non-monetary information in order to improve and evaluate the economic and environmental performance of a firm.

### **2.3.3 Environmental Management**

Environmental management is a term that exists frequently in the literature related to EMA, mainly due to its emphasis on environmental performance. In the case of environmental accounting and EMA, several different definitions on environmental management are available in the existing literature.

Arguably, the use of environmental management assists in reducing environmental impacts (Schaltegger, Burritt & Petersen, 2003). Environmental Management as suggested by Klassen and McLaughlin (1996, p. 1199) is a system that includes all efforts to reduce the negative environment-related impact resulting from a company's products. The broad definition of environmental management given by Gray and Bebbington (2001, pp. 7,8) states that environmental management is "the set of responses by firms to environment-related issues in reviewing their environmental position, developing and implementing policies and strategies to improve that position and in changing management systems to ensure ongoing improvement and effective management". Information related to environmental performance helps stakeholders to understand and identify whether an organization is working successfully in minimizing or reducing environmental impacts.

Given the increasing importance of environmental management and its role in managing and reducing environmental impacts, the development of environmental management systems has attracted more interest and attention. There are many standards and systems for environmental management, as published by several professional bodies for example (ISO14000) the International Organization for Standardization, (BS7750), the Institute of British Standards and Eco-management and the Audit Scheme by the European Union (EU).

These systems or standards can assist a company's management in order to achieve its goals. According to ISO14000, environmental management systems or standards (EMS) comprise of resources, processes, practices, procedures, responsibilities, planning activities and structures to develop, implement, achieve, review and maintain the environmental policies (Wilmshurst & Frost, 2001, p. 136). Arguably, these systems seek to measure and achieve the environmental objectives and targets through three mechanisms that include environmental efficiency of company operations, compliance to regulations, and laws.

Therefore, environmental management systems (EMS) should incorporate a range of procedures dealing with the information flow, execution of the actions related to the environment, assessment of environmental impacts and environmental performance improvement. From this vein, Wilmshurst and Frost (1998), have commented that accounting should play an active role in the implementation and achieving success in the environmental management system by improving the conventional accounting functions and incorporating environmental processes.

Therefore, EMA as an important part of the environmental accounting infrastructure could be an effective instrument to support and implement environmental management and cleaner production projects. It can assist the organization's management in many aspects such as reducing environmental impacts, evaluating environmental programs, reporting environmental performance, and selecting environmental indicators (Jasch, 2006b; Staniskis & Stasiskiene, 2006).

Based on the above discussion, there is much focus on managing environmental performance and reducing environmental impacts, as this can help determine the nature and importance of environmental costs. The next section discussed on environmental costs.

#### **2.3.4 Environmental Costs**

Environmental costs represent a main component of environmental accounting. According to Atkinson, Kaplan and Young (2004), there are two types of environmental costs: implicit and explicit costs. There are many types of explicit costs: for example, costs related to modifying technologies and processes, cleanup and disposal, and litigation. Implicit costs usually include administration costs, legal counsel, employees' awareness, and costs related to the monitoring of environment-related issues. However, it seems that this classification, based on explicit and implicit costs, offers no adequate guidance to identify environment-related costs; however, it discloses complexities in defining these costs. Such costs ideally should comprise all costs related to environmental impacts resulting from a firm's operations, which may not be feasible in the practice (Chang, 2007). A more extensive definition was provided by USEPA (1996). It categorizes environmental costs into two types:

internal and external. Internal costs include costs that have a direct impact on an organization's financial performance, while external costs include costs for which an organization is not accountable, for example, costs to individuals, society and the environment (Beer & Friend, 2006, pp. 549, 550). Jasch (2003) also contends that environmental costs include all those costs coming from environment-related damages and protection.

There seems to be a consensus on classifying environmental costs into two types (internal and external) (Deegan, 2003; Jasch, 2003; Schaltegger, Hahn & Burritt, 2000; UNDSO, 2001; USEPA, 1995b). It is clear that internal environmental costs are incurred within an organization; however, these costs frequently are not traced or are invisible. Therefore, such costs are ignored when making decisions. In contrast, external environmental costs are incurred outside the organization, and these costs do not appear in an organization's accounts. Generally, it is not easy to evaluate social and environmental costs completely, as different methodologies are used to estimate these costs. According to IFAC (2005), an organization can take into account the external environmental costs in its decision-making process. However, an organization typically does not seek to compute these costs. At present, EMA does not attempt to calculate external environmental costs as it is believed that organizations are not responsible for them legally. In fact, there are many reasons for the failure of the companies to compute these costs. Some of these reasons include the following:

- There are no accounts for external costs in the accounting records of companies;

- Companies usually find that it is difficult to access reasonable estimates for these costs;
- Companies often are not the only reason for the external effects (Jasch, 2006b, p. 1196).

This thesis focuses only on private or internal costs that directly affect an organization and its financial performance. It is worth mentioning that identifying relevant environmental costs is very important for internal management purposes (UNSD, 2001). Several different ways of classifying environmental costs have emerged in the available literature in order to identify environmental costs and their potential importance (Burritt *et al.*, 2002; Jasch, 2003; Schaltegger & Burritt, 2000; USEPA, 1995a). However, only five classifications have received attention as following:

- Conventional cost accounting is based on the ordinary and extraordinary; variable and fixed; direct and indirect; process and job; standard and historical (IFAC, 2005; Schaltegger & Burritt, 2000).
- Measurability is based on societal; contingent; less tangible; indirect hidden and conventional (USEPA, 1995b).
- Quality is based on prevention; assessment; control or internal failure and external failure (Ansari *et al.*, 1997; Russell, Skalak & Miller, 1994).
- Life cycle and activity costs are based on life cycle such as production, design, research and development, etc; activities such as facility, product sustaining, batch, and unit level costs (Kreuze & Newell, 1994); and
- Target audience is based on internal costs which include employees and managers; external costs relate to customers, suppliers, environmental



protection agencies, tax agencies, shareholders and creditors (Schaltegger & Burritt, 2000).

### **2.3.5 Information Types of EMA**

Implement and using EMA in an organization must take into account two types of information (physical and monetary) on material use, labor hours as well as the other cost drivers. Monetary and physical information included under EMA will be discussed in this section.

#### **2.3.5.1 Non-monetary Information related to EMA**

The physical or non-monetary data are relevant and required to assess costs correctly in an organization. According to IFAC (2005), EMA focuses especially on non-monetary (physical) information associated with materials, energy and water uses, wastes and emissions because many environmental impacts of organizations are directly related to these uses, wastes and emissions. Besides, costs related to the purchase of materials are an important driver of costs in most companies. Thus, physical information of EMA is necessary and required to assess several environment-related costs and help the organization in evaluating and reporting environmental performance.

Indeed, many companies need main resources (materials, energy and water) to support their operations and activities. This is for industrialized sectors and also for unindustrialized sectors, for instance, agriculture sector, service sector and transport sector. To effectively reduce and manage environmental impacts, organizations must

track and minimize the amount of the materials, energy and water used and the wastes generated.

Many benefits of physical information come under EMA. Physical information, for example, can help an organization to track and control all of the resources used in their operations, and to ensure that those resources are taken into account (IFAC, 2005; UNDSO, 2000). In addition, such information might be used to create indicators of environmental performance which assist to set the environmental target and manage the environmental performance of organizations (Chang, 2007).

#### **2.3.5.2 Monetary Information related to EMA**

Monetary accounting information covers environmental costs that are defined depending on intended uses. Environment-related costs often comprise all types of costs associated with the expenditure of environmental protection. These costs typically are incurred through efforts to prevent or control the environment and healthy damages which may occur via generation of wastes and emissions, for example, the cost of cleaning up sites and treatment costs of the wastes and emissions (IFAC, 2004; UNDSO, 2000).

According to the IFAC (2005), environmental costs under the EMA system include expenditures of environment protection , as well as other financial costs required to effectively manage a firm's environmental performance. For instance, the purchase costs of materials, energy and water, which have been used or may have been converted to wastes or emissions eventually. Organizations need such information and environment related costs to fully evaluate financial aspects for environmental

management concerning the use of the resources and generation of the wastes. The physical EMA information can play a vital role in this area through giving needed information about flows and amounts related to all natural resources and wastes for evaluating purchase costs.

As mentioned earlier, the physical and monetary sides of EMA are mainly linked in many aspects. An organization can use both physical and monetary EMA information to determine environmental costs and to effectively manage important aspects related to organizational environmental performance.

#### **2.4 Drivers behind EMA**

The interaction of organizations with the environment has become one of the interesting issues in communities. The significance of this issue is seen through increasing government regulations and legislation, community interest and growing focus by media about an organization's environmental performance (Deegan & Gordon, 1996; Wilmshurst & Frost, 2001). Schaltegger, Muller and Hindrichsen (1996) have commented that during the last two decades, awareness of environment-related issues has grown dramatically, and membership of environment-related pressure groups has been increasing in many countries around the world over this period. Several quarters have argued that an organization needs to meet the objectives and requirements of its stakeholders relating to environmental issues (Clarkson, 1995; Holland & Foo, 2003; Kulkarni, 2000). Thus, organizations have come under increasing pressure from various groups regarding the need to improve and report their environmental performance and develop their information systems including accounting systems.

The IFAC (2004) argue that pressures from stakeholders are forcing companies to look for new techniques and efficient tactics in order to manage and minimize environment-related impacts. Wilmshurst and Frost (1998) state that, given the growth in communities' concerns and government regulations, organizations should evaluate and report their environmental performance. Additionally, there is an urgent need to incorporate monetary and physical information relating to the environment.

The literature review has identified reasons and drivers for the increasing interest in EMA all over the world. The most important drivers include the increase in environmental legislation, governmental initiatives, environmental pressure groups, growing significance of environment-related costs, and the failure of conventional accounting systems in addressing environmental issues (Burritt & Saka, 2006; Gale, 2006b; IFAC, 2004; Kokubu, 2002; UNDSO, 2000; Wilmshurst & Frost, 2001). For example, Welford and Gouldson (1993) state that the environmental legislation development is one of the most important factors influencing industry behavior in the environment field. In addition, mounting pressures from various stakeholder groups such as governments, employees, consumers, lenders, shareholders and investors have played an important role in the emergence of EMA (Gale, 2006b; IFAC, 2004).

These pressures have impacted organizations' behavior in regard to environmental responsibility and changed their management systems including accounting. In this regard, the UNDSO (2000) stated that a number of businesses reviewed and changed their management procedures as a response to stakeholders pressures to more correctly measure environmental costs and environmental protection benefits. It is

argued that increasing the interest of stakeholders in green issues has forced many managers to provide information on the environmental performance of organizations in their reports (Azzone, Brophy, Noci, Welford & Young, 1997; Holland & Foo, 2003).

Furthermore, the increase in the environmental costs is also one of the reasons for the development of several guidance documents related to EMA around the world (IFAC, 2004; Sendroiu *et al.*, 2006). However, by using conventional accounting system, it may not be possible for firms to accurately identify environmental costs (UNSD, 2000). Gale (2006b) states that traditional management accounting typically does not supply accurate and sufficient information to the management for managing environmental impacts. Hence, both the benefits and costs relating to sound environmental management would be significantly underestimated. This is considered another reason for the push toward the development of conventional management accounting practices to include environment-related issues. The following subsections discuss such drivers or reasons for the development and adoption of EMA practices by organizations.

It is worth mentioning that intensities and types of pressures on companies with regard to adoption and use of EMA may vary significantly among different countries especially between developed and developing countries, as well as, from sector to sector in different businesses, depending on a company's participation in international markets (IFAC, 2004). For example, in some countries, employees have exerted a powerful influence on organizations, whereas consumer and environmentalist groups are the main factors in other countries. Consumers in the United States, Scandinavia,

Netherlands and Germany usually take a deeper interest in environmental issues than counterparts in the United Kingdom (Ahmad, 2004). On the other hand, less pressure is exerted by consumers and other interest groups on organizations regarding environmental issues in developing countries including Libya (Andrew, Gul, Guthrie & Teoh, 1989).

#### **2.4.1 The Environmental Legislation**

In recent decades, environmental damage, such as climate change, the depletion of the ozone layer and acid rain created by the negative impacts of organizations' activities, has become a widespread concern. Public concern about environmental issues has led to the growing body of regulations and laws that address these issues in many countries (Wilmshurst & Frost, 2001). In the United States, environmental protection began in the late 1960s when the Environmental Protection Agency (EPA) was set up. The United States and Canada were the first countries that established environmental regulations in the early 1970s (Ahmad, 2004). Then European countries embarked on a rapid development of environmental regulations and laws. Libya, like many developing countries, also introduced the environmental protection law in 1982.

Several international conferences and agreements were held. Examples include the World Summit on Sustainability Development in Johannesburg and Kyoto Protocol for reducing emissions and controlling global pollution. Environmental issues are influencing economic growth and the development of international trade. For example, the General Agreement on Tariffs and Trade (GATT) started to change its practices by the introduction of an environmental code as response to environmental regulations (Ahmad, 2004).

Despite the introduction of environmental regulations and laws, there was a debate on whether accounting systems should play a vital role in addressing environmental issues during the 1970s. However, this changed when environmental costs and liabilities significantly increased because of the growing pressures in many countries (Burritt & Saka, 2006; IFAC, 2004). For example, the strong environmental regulations in developed countries led to the dramatic increase in many types of environmental costs. Manufacturing costs in developed countries have risen due to environmental compliance. These costs include costs attributed to the purchase of required pollution and control equipment, monitoring of wastes and emissions, fees and regulatory paperwork and reporting. In addition, there is an increase in liability costs related to remediation of sites and insurance costs resulting from compliance with regulations of pollution clean-up (IFAC, 2004, 2005; Kokubu, 2002; Li, 2004; UNDSO, 2000).

Sendriu *et al.* (2006), suggest that a high level of environmental costs and potential liabilities in the European countries and the United States played a vital role in the spread of EMA practices and compelled businesses to assess their environmental costs. According to UNDSO (2000), firms started to develop environmental programs to decrease environment-related impacts and save money, as a response to increased environmental legalities in many countries. These firms need to identify costs and revenues, leading to growing interest in the role played by accounting, in addressing environmental issues (Burritt & Saka, 2006).

As a result, management accounting practices have developed in response to the need to help organizations to reduce environmental impacts and improve environmental

performance. Therefore, it is safe to say that increased regulations have forced many organizations to adopt and implement EMA practices in many countries. These regulations and legislations have caused the organizations to incur environment-related costs in order to help the organizations to identify, allocate and report environment-related costs arising from the activities (Gale, 2006b; Wilmshurst & Frost, 1998).

Therefore, EMA can provide sufficient and accurate environmental information about an organization's activities for managing, improving and reporting environmental performance. EMA also plays an important role to promote the organization's management for the planning of new systems of production, taking into account, new incentives and regulations designed to internalize other types of environment-related costs, which are now external (UNSD, 2000).

However, relevant literature has drawn attention to the low level of environmental legislation in developing countries, including Libya, when compared to developed countries. Moreover, the legislation has little or no direct impact on accounting and reporting practices (Belal, 2001; Jamial , Alwi & Mohamed, 2002; Rajapakse 2002 ; Surmen & Kaya 2003). This might partly explain the differences between developed and developing countries in terms of implementation of EMA practices.

#### **2.4.2 The Government Initiatives**

The initiatives by governments - local, national and international - governmental organizations and the educational institutions in different countries have contributed to EMA practices (Burritt & Saka, 2006; Li, 2004). These organizations and bodies



have already published many guidance documents, pilot projects and national case studies to identify the best EMA practices in different contexts (e.g. the United States, the United Kingdom, Spain, Philippines, Japan, Germany, Finland, Czech Republic, Canada, Austria, Australia and Argentina) (Bartolomeo *et al.*, 2000; Bennett & James, 1998b; Burritt & Saka, 2006; IFAC, 2004; UNDSO, 2000).

The United States established the Environmental Accounting project in 1992 as part of the implementation of the Pollution Prevention Act of 1990. The project was funded by limited resources, through outreach efforts initiated by other government departments in collaboration with partner organizations. As part of this Project, a range of activities with various objectives was undertaken by Environment Protection Agency (EPA), in collaboration with organizations or other enterprises. These efforts included the following activities:

- Definition of the roles, terms and concepts of different enterprises;
- Development of incentives;
- Outreach, guidance, training, and education; and
- Development of analytical systems, methods and tools (UNDSO, 2000).

In relation to EMA, USEPA developed the first formal program for the promotion of EMA adoption in the early 1990s. Many case studies were undertaken to support the applications of EMA in different industries. Since then, governmental agencies and other organizations in many countries have started promoting EMA through a variety of environmental accounting initiatives (IFAC, 2005; UNDSO, 2000). For example, in the United Kingdom, the Environmental Agency has provided an Initiative for

Environmental Accounting, which covers its specific activities, comprising financial accounting, environmental planning and management accounting. The initiative has been supported by local authorities, national government and corporations.(Bennett, 2006; UNDSO, 2000). In addition, the Environment Agency in Canada has drawn up a preliminary guide to cover environmental accounting aspects such as qualitative provision of information, financial and non-financial information, and inclusion of some external environment-related costs. The Environment Agency in Canada also provides consultancy services on EMA, environmental management systems (EMS) and other aspects of environment protection for small businesses (UNDSO, 2000). In 1999, Finland published several guidelines related to EMA and Environmental Reporting for corporations (UNDSO, 2000).

The Japanese Environment Agency has published draft guidelines in order to evaluate environment-related costs, as well as disclose information generated by environmental accounting systems. The guidelines also define and calculate environment-related costs, as well as practices for reporting and accounting for internal costs. In addition, the Japanese government recently has produced a number of initiatives to develop environmental accounting, including EMA (Burrill & Saka, 2006; Kokubu, 2002; UNDSO, 2000). The Ministry of Economy, Trade and Industry (METI) and the Ministry of the Environment (MOE) have produced two governmental initiatives on environmental accounting. Kokubu (2002) found that these guidelines have played an important role in influencing EMA practices in Japan.

Compared to the situation in the developed countries, the number of initiatives introduced by governments in developing countries (including Libya) is still small.

Furthermore, the national and local government agencies have limited influence on accounting and reporting practices (Burritt, 2004; Li, 2004; UNDSO, 2001; Viere, Herzig, Schaltegger & Burritt, 2006a). Therefore, it is not surprising that EMA practices in developing and developed countries may vary.

### **2.4.3 The Pressures of Stakeholders**

Many organizations in various countries are concerned about environment-related issues, due to several external and internal stakeholders' interest in the environmental performance and its impact on organizations. Internal stakeholders constitute the management or employees affected by toxic waste on the production sites while external stakeholders include many parties, such as customers, shareholders, suppliers, investors, government regulators, environmental activist groups, communities affected by local pollution and others (Gale, 2006b; IFAC, 2004; Mia, 2006; Schaltegger & Burritt, 2000).

Environmental pressures exerted by the stakeholders may vary widely in the type and intensity among different economic sectors and societies. However, it should be noted, that stakeholders are continually forcing organizations to manage and minimize environmental impacts, and improve and report environmental performance (Gale, 2006b; IFAC, 2004, 2005). Wilmshurst and Frost (2001) suggest that given the growth in government regulation, legislation and community concern organizations should give serious consideration to the evaluation of environmental performance.

As a result of these pressures, environment-related benefits and costs are on the rise, and have become a significant part of the decision-making process in organizations

(Gale, 2006b). In the past, costs related to corporate environmental performance were relatively low, but now, increasing stakeholders pressures in many countries have increased environment-related costs (Bennett & James, 1998b; Gale, 2006b; IFAC, 2004; Scavone, 2006a). According to IFAC (2005), several prominent examples at the international level of environmental pressures include the following:

- pressures related to the supply chain, for example, large firms require suppliers to comply with standards related to the environmental management of the ISO (Schaltegger & Burritt, 2000);
- pressures exerted by various stakeholders on companies to disclose their environmental performance, such as using of Global Reporting Initiative's guidelines (Schaltegger & Burritt, 2000);
- Pressures related to financing, as a result of the increase in the funds of socially responsible investment, disclosure requirements of investments policy and investment rating systems for example, Sustainability Index (Dow Jones) (IFAC, 2005);
- pressures related to regulatory control such as European Union regulations that restrict the use of dangerous substances in electronic and electrical equipment sold in European countries (Schaltegger & Burritt, 2000);
- Pressures related to environmental taxes, for example, emissions fees, landfill fees, energy-use taxes and carbon taxes, imposed by governments (Bennett & James, 1998b; IFAC, 2005);
- pressures related to cap and trade, for example Kyoto Protocol which include important aspects on trading and emissions cap (IFAC, 2005, pp. 10,11).

As mentioned earlier, it is clear that organizations are facing growing concerns from stakeholders about their environment-related impacts; and these stakeholders need various types of information. For example, company's management requires data about revenues, costs and profits. Community and environment protection agencies need information about environment-related impacts, whereas the tax authorities, shareholders, and investors are concerned about environmental assets and liabilities. Thus, environmental accounting emerged in order to supply needed information that meets all stakeholders' demands (IFAC, 2004; Staniskis & Stasiskiene, 2006; UNDSO, 2000).

According to IFAC (2005), organizations are aware of the importance of potential benefits gained by improving environmental performance. The organizations have discovered that effective use of main resources (materials, energy and water) would bring environmental improvements such as minimizing resources used, wastes and emissions, besides the profits resulting from decreased costs of materials purchased and treatment of wastes.

Moreover, there are many other benefits that could be gained through improvement of environmental performance, such as product designs that are sensitive to the environment, and improved relationships with different stakeholders in society. Therefore, organizations need a wide range of expertise in different aspects, such as managerial, technical, financial, accounting and environmental experts for making effective decisions to reduce environment-related costs, and gain more benefits, as well as deal with the pressures mentioned above (IFAC, 2005).

In this respect, arguably, accountants can play important roles given their access to monetary information of a company and their ability to validate the quality of this information, besides having needed skills to use information to assist sound decision-making in different businesses, for example, budgeting, strategic planning, and investment appraisal (Bennett & James, 1998b; Gray *et al.*, 1993; IFAC, 2005; Jasch, 2006a; Scavone, 2006b; Wilmshurst & Frost, 2001). For example, Gray *et al.* (1993) have indicated that the accounting profession and accountants have a lot to contribute to measuring and reporting environmental performance because of their expertise and experience in many aspects including the following:

- generation, collection and analysis of data and other information existing within accounting systems and records;
- verification of analysis methods and data collection;
- reporting and communication of quantitative data (Bennett & James, 1998b, p. 22).

It should be noted that the benefits resulting from popularizing environmental accounting and making environmental performance reports of organizations available to stakeholders in the society. These reports reveal the extent of the commitment of organizations to environment protection (Li, 2004). Many firms in the first world countries (e.g. Australia, Japan, United States, United Kingdom, and other European countries) have started to develop links between environmental management and management accounting, and use their accounting systems for accessing data on environment-related costs and reporting. For instance, most companies in the United States and some European countries have used their accounting systems as main

sources of environmental costs data (Bartolomeo *et al.*, 2000). In Japan, more firms are reporting important information generated by environmental accounting systems (Kokubu, 2002).

Although environmental accounting information now forms an important element of decision-making in developed countries, there is a lack of similar commitment to practicing environmental accounting, and reporting environment-related issues in the developing countries (Ahmad, 2004; Beer & Friend, 2006; Li, 2004). This is because of the differing pressures exerted by stakeholders in developed countries and developing countries. In developing countries, stakeholders and communities in general do not have sufficient power to exert pressure on the companies in developing countries. Viere, Schaltegger, Herzig and Burritt (2006b) argue that the companies in developing countries are less concerned about the environment and sustainability issues in the absence of pressures from stakeholders. This could partly explain the differences between developing and developed countries in terms of EMA practices.

#### **2.4.4 The Importance of Environmental Costs**

Indeed, the costs related to poor environmental performance were comparatively low in the past (Gale, 2006b; IFAC, 2004; Scavone, 2006a). In this regard, the IFAC (2004) states that stakeholder pressure and environmental regulations were too few to force companies to manage and minimize their environmental impacts. However, the situation has changed, with increasing pressures from stakeholders and environmental legislation. Compliance with the regulations has led to increased environmental costs in many countries. For instance, most developed countries have seen a significant increase in environmental costs, due to the strong regulator regimes and

environmental legislation in these countries. Bennett and James (1998b) state that, costs are growing in many countries. For example, large financial liabilities as a result of a number of criminal and civil actions linked to accidents, and increased environmental and energy taxes, for example, landfill tax, carbon tax imposed as a result of the environmental legislation and pressures on businesses.

The IFAC (2004) have also stated that most companies especially in western countries have seen costs rise, due to compliance with environmental regulations, such as costs of equipment required for monitoring and controlling pollution, and emission fees, as well as, costs related to waste treatment, and insurance. However, the scale of environmental costs and liabilities differs from country to country as a result of different environmental legislation and regulations. In addition, Bartolomeo *et al.* (2000) pointed out that the environmental liabilities of companies in European countries are less than those in the USA because of differing legislative and regulatory regimes.

In relation to EMA, the significance of environment-related costs and liabilities has led to the release of many guidance documents of EMA around the world. In addition, international bodies such as the United Nations and IFAC developed the EMA concept, and explained its relationships with other key terms including environmental costs and environmental management. It is worth mentioning, the increase in environmental costs and liabilities have contributed significantly to the spread of EMA in many countries. Sendroiu *et al.* (2006) state that in the United States, the high level of potential financial liabilities resulting from environmental accidents pushed many companies to improve their accounting systems to evaluate their environmental



costs better. In addition, the programme on Pollution Prevention Pays in European countries played a critical role in understanding and spreading the EMA concept. Many firms have realized the potential benefits of environmental improvements and enhancing eco-efficiency, such as reduced use of the raw materials, energy and water, reduced wastes, and also financial savings from reduced costs of purchased materials and wastes treatment (IFAC, 2004).

According to Bartolomeo *et al.* (2000), most companies in the United States and in European countries are tracking costs for measuring environmental performance and reporting. However, this is apparently not observed, in developing countries, where the potential importance of environmental costs is low, probably due to the decreased impact of environmental legislation, stakeholder pressures, lack of the environmental compliance and poor environmental performance in these countries (Ahmad, 2004; Scavone, 2006a; Viere *et al.*, 2006b). This may also partly explain the differences among developing and developed countries in regard to EMA practices.

#### **2.4.5 The Challenges of Current Accounting Practices**

In spite of the growing concern all over the world about environmental issues and related benefits and costs, the general consensus is that traditional practices of accounting do not supply adequate information for environmental management (IFAC, 2005; Jasch, 2003; UNDSO, 2001). Russell *et al.* (1994) pointed out that conventional accounting systems have failed to allocate environment-related costs to particular processes or products which generated these costs. Thus, that could mean aggregated environment-related costs within cost pools. such costs could be allocated to the products based on production volume measures, for instance, labor hours or

machines, or, instead, they might be deducted as a lump amount from operating income (UNSD, 2001). On the other hand, Wilmshurst and Frost (2001) argue that conventional accounting practices may underestimate the production costs of the items which generate great amounts of wastes, or overestimate costs of items which generate little wastes. Besides, legal costs and potential financial liabilities for violations of the environmental regulations are frequently not accounted for. Hence, developing and adopting procedures relating to environmental accounting might refer to the importance of particular issues for individual organizations.

In addition, the IFAC (2004) argues that several limitations of traditional management accounting practices or systems may make it difficult to effectively collect and assess environmental information. This could mean that management decision-making can be made on the basis of missing, inaccurate or misinterpreted information because of these limitations. Therefore, managers might misunderstand many aspects relating to the environmental issues, such as a range of potential benefits and costs that they can gain to improve the environmental performance and a range of negative financial effects of poor environmental performance. Some of these limitations may be due to some general practices of management accounting in organizations. For example, some limitations are due to the focus on performance in the past rather than performance in the future, and some other limitations are specifically due to environmental information.

Furthermore, a literature review (e.g. Burritt, 2004; Burritt & Saka, 2006; IFAC, 2004; UNSD, 2001; Wilmshurst & Frost, 2001) shows there are some prominent

examples of problems of traditional accounting practices and systems concerning environmental issues and related costs and benefits, including the following:

- Communications among the other functions and accounting frequently are not well developed. For example, the accountants often are not providing the information that may be most useful to the staff in the environmental or technical departments. Moreover, there are different perspectives between different departments concerning the responsibility of managing environment-related costs (Chang & Deegan, 2006; IFAC, 2004, 2005).
- Environmental costs information is usually hidden in overhead accounts rather than assigned directly to products or processes that created these costs. Thus, a number of problems can be created through this practice, for example, there is difficulty to find such information in accounting records, or, the allocation of these costs could be done in an inaccurate way, leading to the distortion of product pricing or another decision (Burritt, 2004; Burritt & Saka, 2006; IFAC, 2004; UNDSD, 2001; Wilmshurst & Frost, 2001).
- The information related to costs, flow and use materials frequently is not tracked effectively, as conventional accounting systems put all materials purchased into one account, and typically do not record the information related to material input for each one from production cost centers. Thus, there is no detailed data about the split between costs of purchased materials and other processes, and little information is available on the actual losses, which may occur during production (IFAC, 2004; Jasch, 2003; Wilmshurst & Frost, 2001).

- The information related to many kinds of environmental cost is not found in a firm's accounting records especially information on the future environmental costs that might be quite significant. For example, costs of the lost sales, lost access to markets and lost access to insurance and financing given to poor environmental performance (IFAC, 2004; UNDSO, 2001).

In relation to the role of EMA in this regard, many organizations in different countries have shown further interest in the role of EMA to overcome the problems and barriers that face conventional accounting systems in dealing with environmental issues. The role of EMA focuses on the efficient use of the main resources and reduction of their consumption (IFAC, 2005). Supporting for this view comes from Jasch (2003, 2006a) who states that EMA is simply doing better management by focusing on the flow of material and provision of consistent information systems. At present, numerous organizations in developed countries (e.g. Australia, Austria, Canada, Germany, Japan, United Kingdom, and United States) are using EMA to track environmental costs and provide the needed information to help the management manage, improve and report environmental performance (Bartolomeo *et al.*, 2000; Burritt, 2004; IFAC, 2004; UNDSO, 2000).

By contrast, implementation and the spread of EMA practices are still quite limited in most developing countries, including Libya, attributable to the absence of external pressures, promotion by the respective governments, and lack of enforcement of legislation. Most Libyan companies have poor environmental performance and no sufficient information related to environmental activities in their reports (Ahmad, 2004; Staniskis & Stasiskiene, 2006). In addition, these companies do not use

environmental accounting information systems for decisions making. Hence, both accountants and managers in developing countries lack awareness of the extent of the improvement of economic and environmental performance and potential benefits that can be obtained by using EMA information in comparison with their counterparts in developed countries (Beer & Friend, 2006; Scavone, 2006a). This might also partly explain the differences between developed and developing countries concerning the spread and use of EMA practices. Burrit (2004) argues that there is an urgent need for further work to identify barriers to the use and spread of EMA practices worldwide especially in developing countries.

## **2.5 Summary of EMA related Research**

As mentioned earlier, EMA has emerged as a new field of accounting in the last two decades, following the growing consensus on the failure of the conventional accounting systems to provide needed information to firms for managing and improving their environmental performance, and supporting environmental management in decision-making and external reporting. As a result, EMA has received increasing attention from academic researchers and professional bodies in many countries. The following tables summarize the main studies relating to EMA in both developed and developing countries.

Table 2.2

*Summary of Previous Studies related EMA According to Research Approach*

Conceptual Study Approach	Case Study Approach	Empirical Study Approach
Schaltegger, Bennett, Burritt, & Jasch (2008); Qian & Burritt(2007); Bennett & James(1998b); Burritt(2004); Burritt, Hahn, & Schaltegger (2002); Cullen & Whelan(2006); Gale (2006b); IFAC (2004); IFAC (2005); Jasch (2003); Jasch (2006a); Li (2004); Mia (2006); Osborn, Savage, Reyes, & Muradyan (2002); Scavone (2006a); Scavone (2006b); Sendroiu, Roman, Roman, & Manole (2006); UNDSO (2000); UNDSO (2001); Wahyuni(2009); Wilmschurst & Frost (1998); Kuasirikun (2005); Onishi, <i>et al.</i> (2006); Yakhou & Dorweiler(2002); Schaltegger <i>et al.</i> (2013).	Chang(2007); Chang & Deegan(2006); Gale(2006a); Jasch & Lavicka(2006); Kumpulainen & Pohjola(2006); Laurinkevičiūtė & Stasiškienė(2006); Onishi, Kokubu, & Nakajima(2006); Viere, Schaltegger, Herzig, & Burritt(2006b); Koefoed(2008); Staniskis & Stasiškiene(2006); Gale (2006a); Burritt & Saka (2006) ; Jasch (2006b); Burritt, Herzig, & Tadeo (2009); Beer & Friend (2006); Erlandsson (2006); Ambe (2007); Schram (2003); Mia (2005); USEPA (1996); Chang (2013).	Kokubu & Nashioka (2006a); Hyršlová & Hájek (2006); Bartolomeo <i>et al.</i> (2000); Wilmschurst & Frost(2001); Kokubu (2002); Sarker & Burritt (2006); Greig, Lord, & Shanahan (2006); Ferreira <i>et al.</i> (2008, 2010); Jalaludin <i>et al.</i> (2010; 2011); Christ & Burritt (2013).

Table 2.3

*Summary of Previous Studies related EMA According to Region*

Developed Countries	Developing And New Industrial Countries
Schaltegger, Bennett, Burritt, & Jasch (2008); Qian & Burritt(2007); Bennett & James(1998b); Burritt(2004); Burritt, Hahn, & Schaltegger (2002); Cullen & Whelan(2006); Chang(2007); Erlandsson (2006); Gale (2006b); IFAC (2004); IFAC (2005); Jasch (2003); Jasch (2006a); Mia (2006); Osborn, Savage, Reyes, & Muradyan (2002); UNDSO (2000); UNDSO (2001); Wahyuni (2009); Wilmschurst & Frost (1998); Chang(2007); Chang & Deegan(2006); Gale(2006a); Kumpulainen & Pohjola(2006); Onishi, Kokubu, & Nakajima(2006); USEPA (1996); Gale (2006a); Burritt & Saka (2006); Jasch(2006b); Kokubu & Nashioka(2006a); Bartolomeo <i>et al.</i> (2000); Wilmschurst & Frost(2001); Kokubu(2002); Sarker & Burritt (2006); (Greig, Lord, & Shanahan (2006); Hyršlová & Hájek(2006); Jasch & Lavicka(2006); Onishi <i>et al.</i> (2006); Yakhou & Dorweiler(2002); Ferreira, <i>et al.</i> (2008, 2010); Schaltegger <i>et al.</i> (2013); Chang (2013); Christ & Burritt (2013); Ferreira <i>et al.</i> (2008, 2010).	<p><b>East Europe Region</b> Staniskis &amp; Stasiškiene(2006); Laurinkevičiūtė &amp; Stasiškienė(2006); Sendroiu, Roman, Roman, &amp; Manole (2006);</p> <p><b>Asian Region</b> Li (2004); Burritt <i>et al.</i> (2009); Viere, Schaltegger, Herzig, &amp; Burritt(2006b); Mia (2006) Mia (2005) ; Kuasirikun (2005), Jalaludin <i>et al.</i> (2010, 2011).</p> <p><b>South America Region</b> Scavone (2006a); Scavone (2006b); Schram (2003).</p> <p><b>African Region</b> Beer &amp; Friend (2006); Koefoed(2008); Ambe (2007).</p> <p><b>Arabic Region / Libya : There is no studies as far as researcher knowledge</b></p>

Table 2.4

*Summary of Previous Studies related to Adoption and Implementation of EMA*

Author/ Year	Chang (2007)	Ambe (2007)
<b>Method</b>	Case study/ interviews	Case study/ interviews & documents
<b>Sample size</b>	Five Universities/ 27 participants	37 companies/ 37 participants
<b>Respondents target</b>	Senior management, Heads of academic schools, Environmental managers, Accounting managers	Environmental managers
<b>Dependent variable</b>	EMA adoption	Implementation EMA
<b>Independent variables</b>	<ul style="list-style-type: none"> <li>• Environmental strategy</li> <li>• Physical environmental uncertainty</li> <li>• Efficiency or Financial considerations</li> <li>• Government Pressure</li> <li>• Mimetic pressure</li> <li>• Normative Pressure</li> <li>• Legitimacy Considerations</li> <li>• Stakeholder Power</li> <li>• Leadership commitment and support</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholder pressures</li> <li>• Government pressure</li> <li>• Resistance to change</li> <li>• Communication among environmental and financial functions</li> <li>• Compliance with legislation</li> <li>• The level of public awareness and education</li> </ul>
<b>Theory</b>	Contingency, Institutional, Legitimacy and Stakeholder	Grounded
<b>Important findings</b>	<ul style="list-style-type: none"> <li>➤ There was a general lack of EMA use within universities due to the factors impeding EMA adoption, which included: resistance to change, low impact of legitimacy considerations, and lack of environmental responsibility and accountability.</li> <li>➤ Few institutional pressures, such as (government, mimetic &amp; normative), low level of leadership support, few stakeholder pressures, and low level of strategic planning did not have a strong impact on the adoption of EMA</li> </ul>	<ul style="list-style-type: none"> <li>➤ The Lack of stakeholder pressures, resistance to change, lack of government pressure, communication gap in environmental and financial functions, low level of compliance with legislation and low public awareness and education, were among most important factors that impeded EMA implementation.</li> <li>➤ This study developed the EMA framework on the roles of government, accounting, industry and public, as important factors may have affected the firms' decision to adopt and implement EMA.</li> </ul>
<b>Limitations</b>	<ul style="list-style-type: none"> <li>➤ The possible bias in the results by the researcher and participants</li> </ul>	<ul style="list-style-type: none"> <li>➤ The generalizability of the findings is limited due to the design of this study</li> </ul>
<b>Future research</b>	<ul style="list-style-type: none"> <li>➤ Identify other views such as those of governments and accountants with regard to EMA adoption</li> <li>➤ Investigate other cultural contexts, that may have different factors affecting EMA adoption</li> </ul>	<ul style="list-style-type: none"> <li>➤ There is a need for further research and experimentation in order to continue the development and implementation of EMA</li> </ul>

Table 2.4 (Continued)

Author/ Year	Kokubu (2002)	Greig <i>et al.</i> (2006)
<b>Method</b>	Empirical / reports & Questionnaire survey	Empirical / Questionnaire survey
<b>Sample size</b>	1430 companies/ 255 reports/184 participants	138 firms / 66 participants
<b>Respondents target</b>	Environmental managers	Chief financial officer
<b>Dependent variable</b>	Introduction and implementation of EMA	Implementation of EMA
<b>Independent variables</b>	<ul style="list-style-type: none"> <li>• Government pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Firm size</li> <li>• financial considerations</li> </ul>
<b>Theory</b>	Institutional	Contingency
<b>Important findings</b>	<ul style="list-style-type: none"> <li>➤ Government guidelines very strongly influenced firms implementation and use of environmental accounting systems</li> <li>➤ Nature of government guidelines have affected the practice of environmental accounting for external purposes or internal purposes</li> <li>➤ Government policies have an effect on the implementation of EMA practices in many firms.</li> <li>➤ Top management play a vital role on the adoption and use of EMA in firms</li> </ul>	<ul style="list-style-type: none"> <li>➤ Size of the firm has a significant influence on EMA implementation decision in firms</li> <li>➤ A little influence on financial considerations on the EMA implementation decision in firms</li> <li>➤ This study did not explain the main reasons behind the lack of implementation of EMA in firms.</li> </ul>
<b>Limitations</b>	<ul style="list-style-type: none"> <li>➤ The time of study, it may be a little bit too early to provide a final conclusion for EMA practices</li> </ul>	<ul style="list-style-type: none"> <li>➤ 65% of the respondents who completed the questionnaire were not from accounting departments</li> </ul>
<b>Future research</b>	<ul style="list-style-type: none"> <li>➤ More research is needed to adopt and develop EMA practices in many firms</li> </ul>	<ul style="list-style-type: none"> <li>➤ There is a need to identify other reasons for non adoption of EMA other than those presently known in the literature</li> </ul>



Table 2.4 (Continued)

Author/ Year	Ferreira <i>et al.</i> (2010)	Kokubu & Nashioka (2006a)
<b>Method</b>	Empirical / Questionnaire survey	Empirical / Questionnaire survey
<b>Sample size</b>	298 firms / 40 participants	136 companies/ 330 participations
<b>Respondents target</b>	<ul style="list-style-type: none"> <li>• Management Accountants</li> </ul>	<ul style="list-style-type: none"> <li>• Headquarters' managers</li> <li>• Manufacturing sites' managers</li> </ul>
<b>Dependent variable</b>	Use of EMA	Introduce and use EMA
<b>Independent variables</b>	<ul style="list-style-type: none"> <li>• Organization's Strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Leadership commitment and support</li> </ul>
<b>Theory</b>	Contingency	Contingency
<b>Important findings</b>	<ul style="list-style-type: none"> <li>➤ The organizational strategy did not affect EMA use, where there was no significant relationship between the use of EMA and company strategy.</li> <li>➤ The organizational size and type of industry were not significantly associated with the use of EMA</li> <li>➤ There were other factors: company's commitment to environmental issues or regulation environment</li> <li>➤ The use of EMA had a positive effect on process innovation, but did not have the same effect on product innovation, and there was a correlation between a strategy and both process and product innovation.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Leadership had a significant role on the introduction and use of EMA in the firms.</li> <li>➤ Company policy significantly affected the design environmental accounting systems and its practices in firms</li> <li>➤ Low awareness of the usefulness of EMA affected its use in the firms</li> <li>➤ Government guidelines had a strong effect on the decision to adopt EMA in firms</li> </ul>
<b>Limitations</b>	<ul style="list-style-type: none"> <li>➤ The sample size was small.</li> <li>➤ The response rate was low.</li> </ul>	
<b>Future research</b>	<ul style="list-style-type: none"> <li>➤ There is scope for further empirical investigation into the relationship between the use of EMA and other benefits related to EMA use</li> <li>➤ There are possibilities of identifying other determinants affecting the use of EMA such as an organization's attitude to environmental issues, and legal requirements.</li> </ul>	<ul style="list-style-type: none"> <li>➤ There is a need to conduct further research on the introduction and use of EMA in many companies.</li> </ul>

Table 2.4 (Continued)

Author/ Year	Christ & Burritt (2013)	Jalaludin <i>et al.</i> (2011)
<b>Method</b>	Empirical / Questionnaire survey	Empirical / Questionnaire survey, interviews
<b>Sample size</b>	1585 firms / 108 participants	1069 companies/ 74 participations
<b>Respondents target</b>	<ul style="list-style-type: none"> <li>• Accountants</li> </ul>	<ul style="list-style-type: none"> <li>• Accountants</li> </ul>
<b>Dependent variable</b>	Present and Future EMA use	EMA adoption
<b>Independent variables</b>	<ul style="list-style-type: none"> <li>• Environmental strategy</li> <li>• Organizational structure</li> <li>• Industry</li> <li>• Organizational size</li> </ul>	<ul style="list-style-type: none"> <li>• Coercive isomorphism</li> <li>• Normative pressure</li> <li>• Mimetic processes</li> </ul>
<b>Theory</b>	Contingency	Institutional
<b>Important findings</b>	<ul style="list-style-type: none"> <li>➤ Environmental strategy, industry and organizational size were found to have a significant association with the present and future use of EMA, while organizational structure was not found to influence either of the EMA variables.</li> </ul>	<ul style="list-style-type: none"> <li>➤ There is no significant relationship between coercive isomorphism and EMA adoption level.</li> <li>➤ Normative pressure was found to significantly affect the EMA adoption level.</li> <li>➤ There is insignificant relationship between mimetic processes and EMA adoption level.</li> </ul>
<b>Limitations</b>	<ul style="list-style-type: none"> <li>➤ The sample size was small</li> <li>➤ The response rate was low.</li> <li>➤ Limited variables</li> </ul>	<ul style="list-style-type: none"> <li>➤ Limited variables and time.</li> <li>➤ Unavailability of existing suitable measurements for the main variables.</li> <li>➤ All the study's measurements were self-developed and have not been used or validated in the past studies.</li> <li>➤ The generalizability of the findings is limited due to the nature of this study</li> </ul>
<b>Future research</b>	<ul style="list-style-type: none"> <li>➤ There is scope for further empirical investigation into the relationship between the use of EMA and organizational structure.</li> <li>➤ There is a need to include other contingencies that may affect the use of EMA.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Besides accountants, there is a need to involvement of other parties in the others organizations.</li> <li>➤ Another important direction for future research is to explore similar issues within other sample types in developing countries.</li> </ul>

From a review of these studies, the following conclusions can be drawn:

**First:** Many studies related to the study of the EMA development have been conducted in different countries. These studies indicate that there has been a steady increase in interest in EMA among many companies, governments, national and international bodies around the world. However, according to Bouma and Veen (2004), most of the attention in the literature has focused on the EMA concept, its inception, its development, type of information, and the tools that can be used in its implementation, rather than on the factors that might facilitate or impede EMA adoption and implementation. Besides, the majority of these research studies were conceptual and case studies. Little attention in the literature has been given to investigate the factors that may influence the adoption of EMA by companies (see Table 2.2).

According to Greig *et al.* (2006), there is limited empirical research on the adoption and implementation of EMA within firms. They confirm that the main factors that impede the adoption and implementation of EMA within companies have still not been determined. In addition, Burritt (2004) states that identifying the suitable circumstances and the factors influencing organizations' decision to adopt and use EMA will be more useful for companies rather than focusing only on the issue the tools that can be used in the implementation of EMA. Many researchers call for further research to investigate the factors which may play an important role in the adoption of EMA within organizations (e.g. Ambe, 2007; Burritt, 2004; Chang, 2007; Ferreira *et al.*, 2008; Greig *et al.*, 2006). Thus, there is a need to conduct further investigations into major factors which may affect the adoption of EMA within

organizations worldwide, and especially in developing countries. Hence, this study is an attempt to contribute to this area by providing empirical evidence for adopting EMA.

**Second:** Most of the available studies concerning the adoption and implementation of EMA in organizations gave greater attention to the perspectives of managers than others. For example, Chang (2007) interviewed 27 managers at five universities in Australia and Taiwan. Ambe (2007) interviewed environmental managers at 37 companies in South Africa. Kokubu & Nashioka (2006a) surveyed the perspectives of 303 managers' in 136 Japanese companies. In Japan also, Kokubu (2002) used a sample of 184 environmental managers from 184 companies in his survey.

A study by Bartolomeo *et al.*(2000) analyzed the perspectives of environmental managers from 84 firms in four European countries including the United Kingdom, Netherlands, Italy and Germany. The focus on one perspective is not enough to explain the factors that may affect the adoption and implementation of the EMA, or the further development of EMA. For this reason, perhaps it would be wrong to depend only on one view to explain the situation of EMA adoption and implementation; thus, research needs to take into account other views about EMA. Support comes from Chang (2007) and Ambe (2007) who state that there is a need to examine other perspectives such as those of the accountants, government institutions, industry, and public, concerning the adoption and use of EMA as a tool for managing and improving organizations' environmental performance. This would give a better understanding of the factors influencing the adoption of EMA, and its spread worldwide.

**Third:** Many studies have shown that there is a steady increase in the spread of EMA in companies in Europe as well as the United States, and the activities about EMA are expected to increase further (Bartolomeo *et al.*, 2000; Hyršlová & Hájek, 2006; Sendroiu *et al.*, 2006). EMA implementation in these countries was intended to help the organizations to manage their internal activities related to environment protection. However, there have been some differences in the EMA practices in these countries. The reasons for the spread of EMA in Europe are different from those in the United States. For example, Sendroiu *et al.* (2006) state that environmental protection programs played an important role in the spread of the concept of EMA in Europe, while the increase of potential liabilities in the United States pushed the firms to practice EMA to better evaluate their environmental costs.

Bartolomeo *et al.* (2000) have analyzed the results of the research project on eco-management accounting conducted by the European Commission (EC) of 1996 and observed that there are some significant differences concerning the use of EMA in some European countries mainly (United Kingdom, Netherlands, Italy and Germany), and the United States. For example, only 19% of the companies in those countries used their accounting systems as the main source of the information on environment-related costs compared with 50% of the companies in the United States.

Besides, only fifty percent of European firms were actually tracking environment-related costs compared to eighty three percent in American companies. They found that the proportion of companies, which allocated such costs to products and processes, was slightly higher in Germany than in the Netherlands, the United Kingdom and Italy. However, this proportion is lower in other European countries,

where the use of EMA generally has been maintained, but it is expected that the proportion will increase in the future. For example Hyršlová and Hájek (2006) found that only 8% of Czech companies implemented EMA and 15% expected to use it in the future.

**Fourth:** Australia is one of the countries that has been given more attention in the literature (Burrirt & Saka, 2006; Chang, 2007; Chang & Deegan, 2006; Ferreira *et al.*, 2008; Sarker & Burrirt 2006; Wilmshurst & Frost, 1998, 2001). However, Australia, along with Japan (Kokubu, 2002; Kokubu & Nashioka, 2006a), and New Zealand (Greig *et al.*, 2006) is lagging behind other countries in North America and Western Europe in EMA practices (Bartolomeo *et al.*, 2000; Greig *et al.*, 2006; Wilmshurst & Frost, 2001).

The two surveys conducted by Wilmshurst and Frost (2001) and Greig *et al.* (2006) showed a negative trend towards environmental accounting issues in Australia and New Zealand, albeit more marked in New Zealand. Although, there was some consistency in Australia and New Zealand about some issues, for example, the majority of the CEOs and CFOs suggested that the accountants were hesitant about getting involved in environmental management, as they believed that accountants were not concerned about environmental issues. However, there were some contrasts, for example, the New Zealand companies generally tend to use EMA information, for reporting rather than for internal decision making; Australian companies tend to use such information for internal purposes rather than for reporting (Greig *et al.*, 2006; Wilmshurst & Frost, 2001). Greig *et al.* (2006) showed that many companies in New

Zealand did not expect to grow their EMA activities in the future, contrary to the case in many European and American companies.

In Japan, Kokubu and Nashioka (2006) state that there has been a rapid increase in the number of companies that practice environmental accounting in Japan. Kokubu (2002), who used the survey conducted by the Ministry of the Environment (MOE) of 2001 to support his study, found that the proportion of the firms which disclosed environmental accounting information increasingly rose from 10.4% in 1998 to 27% in 2000. Kokubu and Nashioka (2005) also found that previous surveys showed a steady spread but this was gradual with regard to EMA practices among companies in Japan. However, Kokubu's survey (2002) showed that Japanese firms used environmental accounting practices for external reporting, more than for internal management purposes. This is because the government guidelines in Japan, especially the guidelines of Ministry of the Environment (MOE, 2000), have very strong influence on the orientation of the organizations towards the use of environmental accounting for external purposes.

The survey conducted by Kokubu and Nashioka (2006) emphasized this fact when their study found that 50% of the top 136 Japanese companies listed in the first section of the Tokyo Stock Exchange and published environmental reports did not use environmental accounting at an internal level. The reason for this is that awareness of the benefits EMA is still low in many Japanese companies. In addition, most Japanese firms are using environmental accounting to comply with the guidelines of the Ministry of Environment (MOE, 2000) that focus on external reporting disclosure more than the guidelines of the Ministry of Economy, Trade and Industry METI that

focus on using environmental accounting for internal functions (Kokubu, 2002; Kokubu & Nashioka, 2006a). This means, there is a marked contrast with the situations in Europe and the United States where the focus is on using EMA for internal management purposes (Bartolomeo *et al.*, 2000; Bennett & James, 1998b; Kokubu & Nashioka, 2006a).

**Fifth:** Research studies about EMA practices in developing and newly industrialized countries indicate that EMA practices in these countries are lagging behind the level of EMA practices existing in developed countries (Ambe, 2007; Beer & Friend, 2006; Burritt, 2004; Kuasirikun, 2005; Viere *et al.*, 2006b). The reasons are many and varied regarding the poor position of EMA in such countries. However, it is argued that the main reason is largely due to the lack of adequate drivers or strong pressures for the adoption and implementation of EMA, as well as environmental and cultural differences between them and developed countries (Viere *et al.*, 2006b).

**Sixth:** There are some differences in the findings of previous studies about the impact of the number of factors on adopting and implementing EMA in organizations. For example, some of these studies have shown that officials in the firms which implement environmental management system (EMS) tend to take positive attitudes towards the adoption and use of EMA in their companies, compared to other officials in companies which did not implement EMS (Greig *et al.*, 2006; Hyršlová & Hájek, 2006). On the other hand, the survey conducted by Greig *et al.* (2006) showed that firm size had a significant influence on the EMA decision and implementation in companies, where they found that implementation of EMA in small companies was lower than in the larger companies. This was supported by Hyršlová and Hájek (2006)



who observed that EMA was used by large companies. However, the survey conducted by Ferreira *et al.* (2008) demonstrated different findings. They found that there was no significance in the correlation between company size and EMA use.

In addition, Ferreira *et al.* (2008) observed that an organization's strategy did not significantly affect EMA use. Their study found no significant relationship between EMA use and company strategy. Similarly, a case study by Chang (2007) found the same result, indicating that an organization's strategic position may influence EMA adoption, but that is not a strong factor and its influence is still unclear or unknown, given the small number of participants' comments on this point. This is inconsistent with the findings of previous studies that indicate that strategy type applied in an organization is one of the important and influential factors in the adoption of organizational practices and innovations (Gosselin, 1997; Gurd, Smith & Swaffer, 2002; Tabak & Barr, 1999).

Furthermore, Kokubu and Nashioka (2006a) found that company policy significantly affected the design of environmental accounting systems and practices in firms. Financial barriers appear to be an important factor that has an impact on the adoption of EMA in the organizations. In this regard, a study by Chang (2007) found that the considerations of cost and benefit would influence the decision to adopt EMA. Besides, he found that resource constraints were one of the barriers to the implementation of EMA. This contrasts with a survey conducted by Greiget *al.* (2006) which showed that cost and benefit considerations had a limited influence on the decision to implement EMA in organizations.

Findings of EMA studies studying the impact of leadership on the adoption of EMA in organizations yielded mixed results (Kokubu, 2002; Kokubu & Nashioka, 2006a; Wilmshurst & Frost, 2001). While some studies found that the support of an organization's leadership for environmental accounting issues had a significant influence on EMA adoption and use in many organizations, the study of Chang (2007) did not find a strong relationship between them. Similarly, there were some contrasts amongst previous studies with regard to the significance of governments' role to promote firms for the adoption and use of EMA. The surveys by Kokubu (2002), Kokubu and Nashioka (2006a) showed that governmental guidelines and policies had a strong effect on organizations' adoption and use of EMA for both external and internal purposes. Ambe (2007) also considered government role as one of important factors which may have an effect on the organizations' decision on the adoption and implementation of EMA.

Such findings are consistent with theoretical perceptions and findings of studies which indicate that governments can play an effective role to encourage organizations to adopt and use EMA to manage their environmental activities (see for example, UNDSO, 2000). However, a study by Chang (2007) found that governmental pressures did not have a strong effect on EMA adoption. Given such contradictions amongst the findings of previous studies, there is a need to further investigate the impact of other factors on EMA adoption and use within organizations.

**Seventh:** Cultural factors may be behind the differences among countries on EMA practices. The study conducted by Bartolomeo *et al.* (2000) suggests that companies in the United Kingdom and the United States which have finance-driven cultures tend

to support EMA more, unlike companies which have a stakeholder culture in countries such as Japan, Germany and other European countries. However, the economic difficulties have had an impact, as many companies in Europe and Japan take into account the financial considerations, and also, some companies in the United Kingdom and United States are also adopting the stakeholders' philosophy. These cultural differences have a significant influence on the accountants and financial managers, for example, accountants in Anglo-Saxon companies play a central role in decision making. Besides, chief executives have knowledge and experience of financial and accounting issues, while this is less frequently seen at the top management levels of companies in other European countries and Japan. Moreover, there are some differences in the accountants' attitudes in different countries to environmental issues (Bartolomeo *et al.*, 2000; Kuasirikun, 2005).

The survey by Bebbington, Gray, Thomson and Walters (1994) revealed that accountants in British companies had a positive attitude to environment-related issues, but their participation in companies' environmental activities was low. Also, Gray *et al.* (1998) indicated that there is a lack of awareness among accountants, in the United Kingdom, of environmental issues. Similarly, Deegan and Gordon (1996) found that accountants in Australia did not view environmental issues seriously as they did not believe that environmental activities formed part of their work. This was confirmed by Wilmshurst and Frost (2001) who found that accountants in Australian companies lacked motivation to participate in EMA.

In contrast, the study by Kuasirikun (2005) revealed that the accountants in Thailand were positive about environmental issues in general. This ambivalence in the accountants' attitudes towards environmental issues is partly due to the cultural

differences and low environmental awareness between managerial staff and accountants, reflected through the development of EMA, and its use in many organizations. Support for this view came from Kokubu and Nashioka (2006a) who found that a low level of awareness level of the staff, including accountants, of EMA benefits have negatively affected the adoption of EMA and its use in many firms. Chang (2007) also highlighted the potential importance of the cultural factors in the adoption of EMA, and he called for an investigation into the impact of such factors on EMA adoption within organizations.

Despite the importance of cultural factors in influencing the opinions and attitudes of individuals within organizations, past studies did not examine the potential influence of these factors on the adoption of EMA. Therefore, the current study is a first attempt in this regard by examining the impact of organizational culture on EMA adoption and providing further investigation into accountants' attitudes towards environmental issues and EMA in the other cultural contexts, such as Libya.

**Eighth:** Although a number of studies have given some important explanations and findings on the impact of a number of factors related to the adoption and implementation of EMA in organizations, it should be noted that these studies are few and limited, and most them have been conducted in liberal market contexts (e.g. Ambe, 2007; Chang, 2007; Greig *et al.*, 2006; Kokubu, 2002; Kokubu & Nashioka, 2006a).

Therefore, using findings that originated in certain economic, political and cultural environment to explain EMA practices in different economic, political and cultural

environments is questionable (Ahmad, 2004; Ali, 1996; Hofstede, 1983). For example, the majority of companies in Libya, in contrast to their counterparts, even in developing countries, have devoted less attention to environmental issues.

In addition, the companies are government-owned and operate in non-competitive markets. The main objective in such companies is not maximizing their market value but achieving society needs (Ahmad, 2004). Moreover, Chang (2007) and Ambe (2007) caution against generalizing the findings of EMA studies, considering the limitations, and the inconsistencies among the findings. They argue that there is a need to examine other perspectives such as those of accountants, governments, the organizations' attitudes on environmental issues, and legal requirements, which seem to have links with EMA, and might have an important role in explaining the differences between countries in the practices of EMA (see, also Ferreira *et al.*, 2008). It is worth mentioning, most researchers (e.g. Ambe, 2007; Chang, 2007; Ferreira *et al.*, 2008; Greig *et al.*, 2006; Kokubu, 2002; Kokubu & Nashioka, 2006a; Wilmshurst & Frost, 2001) contend that there is a need to conduct further research to determine other factors which may influence the adoption of EMA, other than those presently known in the literature.

**Ninth:** Although many studies have been conducted investigating EMA in different countries all over the world, most of these studies have focused primarily on continental European countries; the United States, Australia and Japan as illustrated in the Table 2.3. Indeed, knowledge of the practices of EMA in developing countries is still lacking, as the focus has been on the East European and Asian regions (see also Table 2.3). Little attention has been given to EMA practices in continental African

countries and the South American region. To the best of the researcher's knowledge, research into EMA has not yet been done in Arab countries, including Libya, that have different political and economic systems. Therefore, this study has taken the initiative to examine the factors that may affect EMA adoption in organizations in the Arab world, particularly in Libya. Thus, this study will first provide a description of EMA practices in Libyan companies, and this description will provide a basis for a comparison with the EMA practices in other developing and developed countries.

### **2.5.1 Review of Previous Literature related EMA Adoption**

As explained in the earlier section, EMA-related studies have focused mostly on the concept, development and characteristics of EMA, and tools that can be used to implement this technique. However, limited studies have been conducted on the issues related to the acceptance, adoption and use of EMA or attempted to investigate the factors that may have an influence on such issues. Most previous studies also followed either conceptual or case study approaches to investigate EMA, and are not well developed yet (Christ & Burritt, 2013; Ferreira *et al.*, 2010).

Although the conceptual studies and case studies related to EMA have played a significant role in developing a deeper understanding of the EMA concept (Burritt, 2004; Burritt *et al.*, 2009; Jasch, Ayres & Bernaudat, 2010), such approaches have faced several criticisms in regard to self-selecting organizations and their focus on those large size companies, and working in environmentally sensitive industries, as reported by Burritt (2004, 2005). Thus, it is necessary to use survey-based research in order to extend current knowledge of EMA in practice and integration with existing theoretically approaches, as the data in survey based research are collected from

samples that are larger and more varied. Results from such studies could be generalized (Chang, 2007; Christ & Burritt, 2013; Collison *et al.*, 2003).

In addition, application of the survey approach is required to provide empirical evidence regarding EMA that will be useful to EMA advocates and policy makers. Survey research can also develop a more comprehensive understanding of the issues and organizational settings related to EMA adoption and utilization, and such information is important to develop more complete explanations for the low level of EMA adoption and use as discussed in previous studies. The outcomes can in turn be used to determine influential factors to facilitate acceptance, adoption and use of EMA as suggested by several researchers (Burritt, 2004, 2005; Chang, 2013; Christ & Burritt, 2013; Lee, 2011).

Furthermore, a review of the available literature has shown that most studies related to EMA concentrated on studying EMA in developed countries, but such studies are almost scarce in developing countries, in particular, in Libya. As a result, there is a lack of academic knowledge about the current state of EMA adoption amongst developing countries (Jalaludin *et al.*, 2011). Conducting further research in developing countries is necessary, to further current knowledge and diffusion of EMA, and it is essential that these countries are engaged in research of this nature in order to address environmental problems effectively, as advocated by Burritt (2004) and Osborn *et al.* (2002).

A review of relevant literature indicates that potential benefits of EMA adoption and use are numerous and varied. These benefits comprise the reduction of total costs,

improvement of product pricing, human resource attraction, and improvement of an organization's reputation (Beer & Friend, 2006; Bennett, Rikhardsson & Schaltegger, 2003; Burritt *et al.*, 2002; IFAC, 2005). Previous studies also suggest that the adoption and use of EMA can lead to improved organization performance through making available different information for decision making at different levels (Burritt *et al.*, 2002; IFAC, 2005; Jasch, 2003, 2006a). For example, EMA information can be used to expose the hidden opportunities for improving the processing of management wastes, reducing the consumption of material and energy, or for recycling materials. Furthermore such information can be used to make corporation processes more environmentally efficient (Ferreira *et al.*, 2010). According to IFAC (2005), EMA information can assist in achieving eco-efficiency of an organization through more efficient use of materials, water and energy, leading to the reduction of environmental costs and impacts. Therefore, it is crucial for organizations to adopt EMA practices which not only gives more benefits but more importantly, helps the organization to gain legitimacy and survive (Burritt, 2005; Delmas & Toffel, 2004b; Delmas & Toffel, 2008; Florida & Davison, 2001; Hoffman, 2001; Prakash, 2001; Summers, 2002).

It is also clear from the literature review that even though EMA provides benefits and justifications, the acceptance, adoption and use of EMA practices are still weak among organizations in many countries specially in developing countries (Ambe, 2007; Burritt, 2004; Chang, 2007, 2013; Chang & Deegan, 2010; Christ & Burritt, 2013; IFAC, 2005). In fact, the adoption and implementation of EMA is still relatively at an early stage, and it is a recent phenomenon in the accounting field, and it is seen as a managerial innovation, according to several researchers (Christ &



Burritt, 2013; Ferreira *et al.*, 2008, 2010; Rikhardsson *et al.*, 2005). Therefore, there is plenty of scope for further research into the factors that may influence firms' intention to adopt and use EMA. A number of previous studies have attempted to highlight the factors influencing EMA adoption as summarized in the Table 2.5.

Table 2.5

*Summary of Previous Studies related to Factors influencing EMA Adoption*

Dependent variable	Analysed Independent Variables			Study
	Organizational context	Environmental Context	Technological Context	
<b>Introduction and implementation of EMA</b>	Top management support.	Government pressure.	-	Kokubu (2002)
<b>Implementation of EMA</b>	Firm size, Financial considerations.	-	-	Greig <i>et al.</i> (2006)
<b>Introduce and use EMA</b>	leadership commitment and support	-	-	Kokubu & Nashioka (2006a)
<b>EMA adoption</b>	Environmental strategy, Physical environmental uncertainty, Efficiency or financial considerations, Leadership commitment and support.	Government pressure, Mimetic pressure, Normative pressure, Legitimacy considerations, Stakeholder power.	-	Chang (2007)
<b>Implementation EMA</b>	Resistance to change, Communication among environmental and financial functions.	Stakeholder pressures, Government pressure, Compliance with legislation, the level of public awareness and education.	-	Ambe (2007)
<b>Use of EMA</b>	Organization's strategy	-	-	Ferreira <i>et al.</i> (2010)
<b>EMA adoption</b>	-	Coercive isomorphism, Normative pressure, Mimetic processes	-	Jalaludin <i>et al.</i> (2011)
<b>Present and Future EMA Use</b>	Environmental strategy, Organizational structure, Industry, Organizational size.	-	-	Christ & Burritt (2013)

Some previous research has investigated the extent to which some of organizational factors influence EMA adoption and implementation. However, not all previous studies were in agreement with regard to the impact of studied factors on enhancing EMA adoption and use within organizations. Greig *et al.* (2006), for example, examined the relationships between size of firms and EMA implementation. This study showed a significant influence of a firm's size on EMA implementation in companies, where it found that the implementation of EMA in small companies was less than in the larger companies. This was supported by Hyršlová and Hájek (2006) who observed that EMA was widely used by large companies. However, these findings are not consistent with that of Ferreira *et al.* (2008), which showed that there was no significant correlation between a company's size and EMA use.

Ferreira *et al.* (2010) also investigated the relationship between business strategy and the EMA use. The results revealed that there was no significant relationship between business strategy and EMA use. Similarly, Chang (2007) obtained the same result when the data indicated that the 'influence' strategy was not strong on EMA adoption. This finding is inconsistent with the findings and expectations of previous studies that showed that the strategy applied in an organization is one of important and influential factors for the adoption of organizational practices and innovations (Gosselin, 1997; Gurd *et al.*, 2002; Tabak & Barr, 1999).

Kokubu and Nashioka (2006a) studied the relationship between company policy and financial barriers with the design of environmental accounting systems, and they found that the policy of organization significantly affected the design and practices of environmental accounting systems in firms. The results showed that financial barriers

were important factors that affect the adoption of EMA in the organizations. In this regard, Chang (2007) found that considerations of cost and benefit influenced the decision of EMA adoption. Besides, he found that resource constraints were one of the barriers to implementation of EMA. This finding contrasts with the finding from the survey conducted by Greig *et al.* (2006) which showed that there was a limited influence of cost and benefit considerations on the decision to implement EMA.

Kokubu (2002) investigated the relationship between top management support and adoption of EMA. The findings revealed that the support of the leadership had a significant influence on EMA adoption and use in many organizations. This is consistent with the findings of the study of Kokubu and Nashioka (2006a), which found similar results, although these results were inconsistent with that of Chang (2007) as he did not find a strong relationship between them.

Chang (2007) also examined the relationship between the other factors including physical environmental uncertainty and resistance to change. He found that resistance to change was the most important factor in impeding EMA adoption within universities while the adoption of EMA was not found to be influenced by physical environmental uncertainty. This is in line with the results of the Ambe study (2007), showing that resistance to change, communication gap among environmental and financial functions played important roles in impeding EMA adoption and implementation. More recently, Christ and Burritt (2013) found that the sensitivity of the industry, organizational size and environmental strategy were associated with EMA use but they found no relationship between organizational structure and EMA use.

Other researchers examined the impact of the environmental factors on EMA adoption and use. Similarly, there are some contrasts amongst previous studies concerning the impact of external factors on the adoption and use of EMA. For example, Kokubu (2002) examined the role of the government in enhancing EMA adoption using survey-based research within Japanese organizations, and he found governmental guidelines and policies had a strong influence on firms' adoption of EMA. This result is supported by Kokubu and Nashioka (2006a) who found that governmental guidelines played an important role in introducing EMA practices within Japanese organizations. This is consistent with the suggestion provided by Ambe (2007) who considers government role as one of important factors which may have an effect on an organization's decision to accept, adopt and use EMA. Such findings are also consistent with theoretical perceptions and studies which indicate that governments can play an effective role to encourage organizations to adopt and use EMA (see for example, UNDSO, 2000). In contrast, the Chang (2007) found that governmental pressures did not have a strong effect on EMA adoption in universities.

Chang (2007) also investigated the impact of other factors including normative pressure, mimetic pressure, stakeholder power and legitimacy considerations using the case study approach, through face-to-face interviews. He found that the low impact of legitimacy considerations, and lack of environmental responsibility and accountability were the most important factors in impeding EMA adoption within universities. Contrary to expectations, normative pressure, mimetic pressure, and stakeholder pressures were not found to be a strong impact on the adoption of EMA. The results of this study showed that there seemed to be a general absence of EMA adoption and use to manage the environmental costs within universities, and the role

of accounting to improve environmental performance was still lacking. Furthermore, Ambe (2007) found the lack of stakeholder pressures, lack of government pressure, low level of compliance with legislation and low levels of public awareness and education related environmental issues, were among most important factors that impeded EMA implementation. More recently, Jalaludin *et al.* (2011) found that the EMA adoption level significantly affected the by normative pressure but they found no significant relationship between both of coercive isomorphism as well as mimetic processes and EMA adoption level.

The above discussion has shown that limited studies have been conducted to examine the adoption process of EMA and its influential factors. The results of these studies have highlighted a number of factors that influence EMA adoption and within organizations. Among the dominant factors found to have affected the adoption and use of EMA include top management support, size of an organization, financial barriers, government pressure and more recently, sensitivity of the industry, strategy of an organization, normative pressure, stakeholder pressures and resistance to change. However, most of these studies neglected the influence of technological factors such as perceived benefits and perceived importance on the adoption of EMA as well as the influence of a number of organizational factors such as organizational culture and nature of formalization, which have a significant impact on organizations' behavior to adopt innovations and new practices as found in the literature.

Few researchers attempted to incorporate such factors into their studies, which might play a vital role in enhancing EMA adoption and use among organizations. On the other hand, not all studies were in agreement. The findings of some studies were not

in line with findings found in the literature related to the adoption of innovations and organizational practices, and contrary to the normative arguments and expectations of several researchers in the EMA literature, evidence was piecemeal. The results of previous studies also showed that in practice, the levels of EMA adoption and utilization were very mixed and disappointingly low, suggesting that the benefits gained by EMA do not justify the implementation related costs or that environmental costs are unimportant (Bartolomeo *et al.*, 2000; Chang, 2013; Christ & Burritt, 2013; Ferreira *et al.*, 2008, 2010; Wilmshurst & Frost, 2001).

Given such justifications and contradictions amongst previous studies, there is a need to conduct further investigations into the influential factors on the EMA adoption process within organizations and examine other factors which have been found to be just as important in the adoption of innovations, organizational and environmental practices literature. The next sections discuss in greater detail a number of factors in the organizational, environmental and technological contexts, found in the literature, concerning the adoption of IT, organizational and environmental practices. These factors may impact the EMA adoption process, in order to provide further knowledge and understanding of the motivations and obstacles in adopting EMA, which represent the focus of the present study.

### **2.5.2 Review of Previous Literature related to the Organizational Context**

Based on the literature related to contingency theory, diffusion of innovation theory (DOI) and Technology, Organization, and Environment Framework (TOE), acceptance adoption and implementation of innovations and organizational practices might be influenced by factors in the organizational context that define an

organization's characteristics, which have affected the acceptance and adoption process of innovation and organizational practices (Tornatzky & Fleischer, 1990).

A number of researchers (e.g. Baird, Harrison & Reeve, 2004; Chau & Tam, 1997; Damanpour, 1987; Gurd *et al.*, 2002; Innes, Mitchell & Sinclair, 2000; Tabak & Barr, 1999; Tornatzky & Fleischer, 1990) have suggested that a range of factors in the organizational context will affect the propensity and intention of the organizations to adopt technical and administrative innovations. The organizational variables are many and various, for example, size, strategy, slack, integration, specialization, complexity, functional differentiation, centralization, formalization and climate, which have been examined in the diffusion of the innovations context (Damanpour, 1987; Kimberly & Evanisko, 1981; Saleh & Wang, 1993; Tabak & Barr, 1999). These factors can be classified into three main categories of structure, strategy, and slack, as reported by Tabak and Barr (1999).

Building on the literature related to the adoption of innovations; information technology (IT) and EMA, four main variables in organizational context were selected and assumed to be the most suited for analyzing the adoption process of EMA in Libya's oil and manufacturing sectors. The organizational variables, the focus of present study, are business strategy, nature of formalization, organizational culture and top management support. These variables were chosen as important factors that have been proposed or found to have influenced organizations' behavior towards acceptance, adoption and use of new techniques and information systems. This study explores whether these factors would impact firms' intentions of adopting EMA practices.



### **2.5.2.1 Business Strategy**

The strategy conceptualization provided by Thomas and McDaniel (1990) may count for variation in the adoption rates of technology among firms. Firms that follow prospector strategy are more likely to make strategic decisions because the focus in such organizations is on new technology, new products, and new markets. Thus it is expected that innovative decisions and the accompanying uncertainty of these decisions are likely to be taken into consideration, and would be incorporated in their strategic decision making. The decision makers within prospector organizations are more likely to be the first to see the innovation as beneficial and adopt it. On the other hand, decision makers in defender organizations are more likely to pursue an innovation if it shows success in the industry (Tabak & Barr, 1999).

The empirical studies have found that business strategy is an important variable regarding the adoption and diffusion of accounting innovations. It has been argued that innovation in management accounting systems is a significant influence through the tendency to innovate and implementation (e.g. Bjornenak, 1997b; Gosselin, 1997; Gurd *et al.*, 2002; Saleh & Wang, 1993; Tabak & Barr, 1999). Bjornenak (1997b), and Gosselin (1997). Strategy is identified as an important variable in the adoption and diffusion process of accounting innovations. For example, Gosselin (1997) investigated the impact of business strategy on the activity-based costing (ABC) adoption and implementation. The results of the study showed that the strategy of organization significantly influenced the decision to adopt ABC and he found that the organizations following the prospector strategy tended to adopt the ABC more frequently than those with the defender and analysis strategies. Tabak and Barr (1999) tested the impact of organizational strategy on the intention to adopt technological

innovations. They found a positive relationship between organizational strategy and the intent to adopt innovations within the hospitals.

In relation to the EMA, Ferreira *et al.* (2010) and Chang (2007) for example, suggested that strategy can be an essential factor to successfully adopt EMA. As explained in the previous section, the results from previous studies related to the impact of strategy on EMA acceptance, adoption and use were inconsistent. Thus, the relationship between strategy and the acceptance and adoption process of EMA still needs further investigations. This was examined in the present study to add further explanations to current knowledge and understanding of its influence on firms' intentions to adopt EMA, due to the importance and role of strategy in organizational contexts in influencing the adoption behavior of technical and administrative innovations, as explained in the literature.

#### **2.5.2.2 Nature of Formalization**

The nature of formalization is considered one organizational structure that has a significant influence on the acceptance, adoption and use of new information systems and technology within organizations. Damanpour (1991) for example, suggests that the propensity or capability of organizations to adopt and implement innovations and systems is significantly associated with the nature and characteristics of organizational structures.

The literature shows that there is a significant relationship between dimensions of organizational structure and organizations' behavior to adopt innovations (e.g. Aiken & Hage, 1971; Damanpour, 1991; Gurd *et al.*, 2002; Hull & Hage, 1982). The study

of *Gurd et al.* (2002) indicates that organizational structure is among influential factors in the diffusion process. Hull and Hage (1982) for example, suggest that centralization and vertical differentiation restrains the adoption and diffusion of the innovations in industrial firms. Tornatzky and Fleischer (1990) and Damanpour (1991) both found a negative association between a high degree of formalization and innovations, while flexible rules of labour would facilitate innovation (Aiken & Hage, 1971; Burns & Stalker, 1961). Furthermore, the literature review reveals that formalization based on its nature might be restrictive or supportive of autonomous work, flexibility, and decentralization (Dewar & Werbel, 1979; Nahm, Vonderembse & Koufteros, 2003). For example, Nahm *et al.* (2003) suggest that despite dramatic increase in the amount of formalization resulting from the rules and procedures of ISO-9000, the nature of these written rules and procedures in reality facilitates machine operators' authority in decentralization in decision-making. Thus, formalization has become an instrument to help directors in dealing with issues and problems rather than a frontier that stipulates solutions. According to Damanpour (1991), formalization represents the degree of standardization of the functions by the rules, followed by an organization versus the degree of freedom given to the organization's staff in their jobs. More recently, the literature has focused on the nature of formalization instead the degree of formalization as an important factor in manufacturing contexts. Nahm *et al.* (2003) for example, examined the impact of the nature of formalization on time-based manufacturing practices and plant performance. The findings revealed that the nature of formalization has a significant, positive, and direct impact on decision-making and the level of communication, which in turn, significantly and positively influences the practices of firms in regard to time-based manufacturing and the performance of these firms.

In the EMA context, the relationship between the nature of formalization and acceptance and adoption process of EMA has not yet been investigated, and but is examined in the current study to add further explanations to existing knowledge and understanding of its influence on firms' intentions to adopt EMA, because the nature of formalization is one of important factors in the organizational context that influences the adoption behavior of technical and administrative innovations, as shown in previous studies.

### **2.5.2.3 Organizational Culture**

Organizational culture represents the common meanings that include the beliefs, values, assumptions, behavior and attitudes of the organizational members (Kopelman, Brief & Guzzo, 1990). It shapes the objectives, vision and work environment in an organization that distinguishes it from others (Hofstede, 1984). The literature available shows that organizational culture is a facilitating factor of innovations because of its role in inhibiting or allowing the acceptance and successful adoption of innovations (Bluedorn & Lundgren, 1993; Cameron & Quinn, 1999; Gurd *et al.*, 2002). Cameron and Quinn (1999) among others, argue that organizational culture is usually viewed as an important factor in accepting and adopting any changes and innovations. Besides, the literature shows that the neglect of organizational culture represents one of the frequent reasons contributing to the failure of organizational changes (Shokshok, Rahman, Wahab & Shokshk, 2010; Twati & Gammack, 2006). Several researchers claimed that organizational culture is a key to successful adoption of organizational innovation, and managers need to understand the organizational culture because it affects many activities such as the effectiveness, productivity and strategic developments (e.g. Baird *et al.*, 2004;

Becker, 1993; Cameron & Quinn, 1999; Chin-Loy & Mujtaba, 2007; *Gurd et al.*, 2002; Trivellas & Dargenidou, 2009; Twati & Gammack, 2006; Westbrook, 1993). On the other hand, the argument made by Nickels *et al.* (2007), indicates that a culture encouraging innovations and acceptance of risk would provide required support for higher levels of new technologies adoption.

Previous studies in the IT and IS literature have shown the importance of cultural factors regarding the acceptance and adoption of innovations and new technology. The study of Tuggle and Shaw (2000), for example, suggests that cultural factors might assist or hinder the acceptance and adoption of knowledge management (KM). Baird *et al.* (2004) studied the impact of organizational culture on the adoption of activity management practices. The results demonstrated that organizational culture had a statistically significant relationship with the adoption of activity management practices. Twati and Gammack (2006) explored the relationship between organizational culture and the adoption of information systems (IS). They found that the organizational culture significantly affected IS adoption.

Despite the importance of organizational culture in the acceptance and adoption of innovations and organizational practices, as explained in previous literature, the impact of organizational culture on the level of EMA adoption has not been examined yet. To date, research has not addressed the effects of organizational culture on the firms' behavior in relation to EMA adoption in depth. Several researchers in the EMA field such as Bartolomeo *et al.* (2000) and Chang (2007) suggest that there is a need to explore the extent of the impact of cultural factors on the EMA adoption process. Therefore, this study attempts to integrate organizational culture as one of important

factors in the organizational context, by examining its influence to more fully explain firms' intentions to adopt EMA.

#### **2.5.2.4 Top Management Support**

Many researchers argue that the top management support is an essential factor for effective and successful environmental management systems (e.g. Daily & Huang, 2001; Henriques & Sadosky, 1999; Wee & Quazi, 2005; Wong, 2005; Zutshi & Sohal, 2004). Prominent researchers like Young *et al.* (2001) indicate that top managers' role is a significant determinant in the adoption of innovations by organizations. Hambrick and Mason (1984), and Bradley and Fund (2004) emphasize that senior management's support is fundamental to the success of innovation adoption.

Dewar and Dutton (1986) argue that top managers are responsible for setting the main plans and policies that organize and control various activities and resources, affecting strategic decisions in an organization. As a result, senior managers are the persons who have the authority to make strategic decisions, such as adopting innovations and new management practices. Moreover, top executives can influence job satisfaction and the motivation of employees, in addition to being largely responsible for creating the suitable organizational climate to promote and support the adoption of the innovations and changes in an organization (Beatty, Shim & Jones, 2001; Damanpour & Schneider, 2006; Elenkov, Judge & Wright, 2005).

In addition, Mumford (2000) also argues that the favorable attitude of top executives toward innovation and change facilitates the innovation adoption process through the

provision of moral and physical support to members of the organization for adopting new ideas. Wilmshurst and Frost (2001), for example, found that limited support by the top management towards environmental accounting issues was one of the key factors inhibiting the adoption of environmental management systems (EMS) and environmental accounting systems. In the technology context, Beatty *et al.* (2001) have also provided evidence to show that the adoption and use of technology have been impacted by top management support. Hence, it is expected that top management support is an important factor in EMA adoption in this research.

In the EMA context, there is the notion that senior managers play an important role in successful EMA adoption and implementation. Kokubu (2002) and Kumpulainen and Pohjola (2006) also suggest that the top management support can play an essential role in adopting and implementing EMA. Chang and Deegan (2010) state that the lack of support from top management is one of the key barriers to accounting changes in an organization, and they argue that if the top managers do not realize the importance and potential benefits that can be gained from EMA, it is likely that EMA adoption will be less.

Although previous studies have highlighted the important role of upper management in the acceptance and adoption of new technologies and environmental practices, the importance of upper management support at the level of the EMA adoption process has not been studied in depth. To date, few empirical studies such as Kokubu (2002) and Kokubu and Nashioka (2006a) have been conducted to investigate the influence of upper management on the acceptance, adoption and use of EMA. The findings showed that upper management had a significant impact on the adoption and use of

EMA, but the findings of other studies such as Chang (2007) were inconsistent with the expectations and findings in the literature. The top managers' perceptions can help or hinder the acceptance of new technology and change, as seen in the adoption behavior in their organizations. The current study attempts to examine the impact of top management's support on firms' intentions and their behavior to accept and adopt EMA in Libya's oil and manufacturing sectors in order to extend current knowledge and understanding about the acceptance and adoption of EMA practices.

### **2.5.3 Review of Previous Literature related to the Environmental Context**

The environmental context includes industrial environment, dogmatic environment, social and economic environments. Some research on the adoption of IT (e.g. Alatawi, Dwivedi, Williams & Rana, 2012; Gibbs & Kraemer, 2004; Soares-Aguiar & Palma-dos-Reis, 2008), and on EMA (e.g. Ambe, 2007; Bennett, Bouma & Wolters, 2002; Bouma & Van der Veen, 2002; Chang, 2007; Chang & Deegan, 2010) have used the institution theory within the environmental context of the TOE framework to better explain the impact of environmental pressures on the adoption of innovation and organizational practices.

On the other hand, some studies related to the adoption of environmental practices and EMA (e.g. Chang, 2007; Chang & Deegan, 2010; Darnall, Henriques & Sadorsky, 2009; Delmas, 2009; González-Benito & González-Benito, 2006; Raluca, Chirata, Cornelia & Iuliana, 2009; Wilmshurst, 2006) have used legitimacy and stakeholder theories to provide explanations on the adoption process. Thus, in this study, institutional, legitimacy and stakeholder theories can be considered as the environmental context of the TOE framework. They can use in order to investigate the



extent of the impact of external pressures on organizations about the acceptance and adoption of EMA to extend current knowledge and better understand the influence of environmental factors on firms' intention to adopt EMA practices in a given context.

Based on previous literature related to IT, EMA and environmental practice adoption, four main variables in the environmental context were selected and assumed to be the most suitable for analyzing the acceptance and adoption process of EMA in Libya's oil and manufacturing sector. These variables include coercive pressures, normative pressures, legitimacy considerations and stakeholder pressures, which played an important role in facilitating the acceptance and adoption of new technologies and practices in several areas, as explained in the IT/IS literature. This study seeks to explore the extent to which these factors affect firms' intentions to adopt EMA practices. The subsequent sections provide an overview of the literature.

### **2.5.3.1 Coercive Pressures**

Coercive or government pressure seems to be one of important variables in institutional and adoption research (e.g. Abrahamson, 1991; Delmas, 2002; Delmas & Toffel, 2004b; Delmas & Toffel, 2008; DiMaggio & Powell, 1983; Hoffman, 2001; Lapsley & Wright, 2004; Sutton, Dobbin, Meyer & Scott, 1994). According to Abrahamson (1991), government generally is one of outside groups that has a greatly influence on managerial innovation. Lapsley and Wright (2004) also argue that the adoption of innovations is greatly influenced by government pressures, in particular, in the organizations operating in the public sector as the employees in these organizations tend to respond to the governmental guidelines and policies. King *et al.*

(1994) state that the government assistance has played a main role in hastening the adoption of information technology within SMEs.

On the other hand, the assumption of the institution theory, as stated by DiMaggio and Powel (1983), indicates that organizations may change their systems to conform to government's policies to obtain legitimacy or guarantee funding support. For example, organizations often seek to adopt new technologies for pollution control to comply with the environment-related regulations. The organizations operating in the public sector also tend to comply with policies and requirements issued by the government, due to their dependence on financial support provided by the government and for maintaining their survival.

Furthermore, Delmas and Toffel (2004b), and Hoffman (2001) state that government organizations are the most important key drivers or visible stakeholders to influence the environmental practices of the organizations. For example, incentives offered by various European governments greatly contributed to the wide acceptance of ISO14001 certification in Europe, as argued by Delmas (2002). He observed that governments play a significant role in the decision of firms on ISO14001 adoption. For example, the government acts as a coercive force through sending an obvious sign of their approval of ISO14001, and also through providing technical assistance related to facilitating the adoption process of this standard.

A literature review also reveals that legislation represents one of most important factors that is imposed on many organizations to address the environmental issues (e.g. Delmas, 2002; Delmas & Toffel, 2004a; Delmas & Toffel, 2004b; Gadenne &

Zaman, 2002; IFAC, 2004; Rugman & Verbeke, 1998; Welford & Gouldson, 1993). Increase in environmental legislation in many countries pushed organizations to adopt several environmental initiatives and programs in order to reduce the environmental impacts, save money and achieve sustainable development (UNSD, 2000; Walley & Whitehead, 1994). For example, Welford and Gouldson (1993) state that environmental legislation is one of most important factors that has compelled organizations to address environmental issues.

Thus, government pressures also appear to be one of key factors in influencing EMA practices. Available literature reveals that many governments and local, national and international governmental organizations have played an important role to promote EMA practices in organizations (Burrill & Saka, 2006; Li, 2004). The governmental agencies in several countries (e.g. United States, United Kingdom, Spain, Philippines, Japan, Germany, Finland, the Czech Republic, Canada, Austria, Australia, South Africa and Argentina) realized the importance of EMA, and they have already set and published many guidelines and pilot projects to undertake national case studies to identify the best EMA practices, and to teach organizations on the acceptance and adoption (Bartolomeo *et al.*, 2000; Bennett & James, 1998b; Burrill & Saka, 2006; IFAC, 2004; UNSD, 2000).

The previous studies have drawn attention to incentives and assistance offered by the government, as these initiatives can promote the adoption and use of EMA. For example, Kokubu (2002) found that initiatives and support provided by the Japanese government encouraged the adoption of environmental accounting practices and environmental reporting by a greatly number of Japan's firms. However, it is argued

that, a lack of the pressures, or assistance provided by the government could impede EMA adoption within organizations (Chang, 2007).

Moreover, compliance with environmental legislations led organizations to bear many burdens and costs, and thus increasing many organizations' interest in the role of environmental accounting systems including EMA. For example, Sendroiu *et al.*, (2006) state that strict legislation in many developed countries such as the European countries and the United States played a vital role in spreading EMA practices due to huge environmental costs and liabilities resulting from the legislation, and thus, pushed many businesses to realize the importance of EMA use for tracking and managing the costs and liabilities.

Yet, despite findings highlighting the important role of coercive pressures in the acceptance and adoption of EMA, the relationship between EMA acceptance and adoption has not been studied in depth. A few empirical studies (e.g. Kokubu, 2002; Kokubu & Nashioka, 2006a) have been conducted to examine the impact of coercive pressures on the acceptance and adoption of EMA.

The findings showed that pressures exerted by the government and legislation played a vital role in promoting the adoption of EMA among firms. However, the findings of other studies such as Chang are in conflict with the expectations and findings provided by previous studies. This study seeks to investigate the impact of coercive pressures on firms' intentions to adopt EMA in Libya's oil and manufacturing sectors to provide further explanations on the adoption of EMA.

### 2.5.3.2 Normative Pressures

The normative pressures by professional associations and formal education also appear to be one of the important institutional factors in the literature (e.g. Carmona & Macias, 2001; Chang, 2007; DiMaggio & Powell, 1983; IFAC, 2005; Li, 2004). According to Chang (2007), professional organizations represent one of important factors that drive organizations to conduct changes including accounting. Moreover, with the growing attention given to environmental issues, several professional bodies such as ISO and GRI are interested in developing guidelines and standards related to environmental management and reporting, and environmental performance indicators (Li, 2004). The presence of such guidelines and standards facilitated and encouraged the adoption of environmental management systems (EMS) during the 1990s.

In the context of EMA, several professional accounting associations such as ACCA and IFAC have also played a key role in promoting EMA. These bodies have published several initiatives, guidance documents on EMA, and devoted significant resources to this purpose. For example, the International Federation of Accountants IFAC published the International Guidance Document to guide EMA studies and practices of both the organizations and individuals to provide access to further information on EMA.

In addition, an International Expert Working Group affiliated to the United Nations has published a document entitled '*Environmental Management Accounting: Procedures and Principles*' to explain the concept of EMA and provide a number of guiding principles for EMA application (UNSD, 2001). This promotion and support of EMA by accounting bodies and the professional associations have placed some

normative pressure on corporations to adopt some EMA practices, in many countries, particularly, in developed countries (Chang, 2007). This pressure is clearly evident from the organizations' behavior towards environmental issues, and attempts to introduce fundamental changes and new innovations to their systems, including accounting, in order to comply with guidelines and standards created by professional organizations (Chang, 2007).

Moreover, an argument of institution theory as provided by DiMaggio and Powell (1983), proposes that the professional bodies and formal education can contribute to apply normative pressure for changes to organizational practices, and professional behavior. Delmas (2002) also argues that directors tend to depend on their experiences to construct scenarios appropriate for decision making in cases when information required is not easily available, or when the costs of getting are not ideal. Moreover, the method of individuals in dealing and managing different issues is often influenced by formal education. Bennett *et al.* (2006) indicate that the different educational backgrounds of individuals lead to different opinions about certain issues, for example, the management of environmental performance. Similarly, it is argued that professional associations and formal education can play a fundamental role in enhancing EMA acceptance and adoption process as explained by Chang (2007).

However, despite the importance of normative pressures, limited attention has been given to examine the impact of normative pressures on EMA acceptance and adoption. The first attempt made to investigate the relationship between normative pressures and EMA adoption was by Chang (2007). Contrary to expectation, this study showed that pressures exerted by professional associations and formal education were not found to have a strong impact on the adoption of EMA. From this

standpoint, the present study seeks to further investigate the impact of normative pressures on Libya's oil and manufacturing organizations' acceptance, and intentions of adopting EMA, and their attitude and behavior towards EMA practices.

### **2.5.3.3 Legitimacy Considerations**

The literature on environmental management shows that decisions of organizations for adopting the environmental practices and strategies are impacted by the need to maintain or enhance its relations with society (Delmas & Toffel, 2004b; Delmas & Toffel, 2008; Florida & Davison, 2001; Hoffman, 2001; Prakash, 2001; Summers, 2002). According to Hoffman (2001), pressures imposed by social activists represent one of the visible drivers that push the organizations to introduce environmental measures in organizational practices, including accounting practices. That means the responsibility of organizations to environmental issues might be an important reason to introduce changes into accounting practices.

Delmas and Toffel (2004b) argue that the decisions of organizations regarding the adoption of environmental practices are impacted by the need to improve the organization's picture, maintain good relations and legitimacy with the society. Thus, it seems that legitimacy considerations are important to justify internal management operations and practices. On this base, accounting systems can play an important role to provide information to maintain the legitimacy of organizations. In the EMA context, Burritt (2005) argues that EMA information will become necessary if the organizations wish to lower their environmental impacts and related costs in order to maintain their legitimacy in the eyes of stakeholder groups in society. On the other hand, the legitimacy theory as mentioned by Chang (2007), emphasises that the main

objective of corporations is earning good reputation by operating within society's bounds and norms. Legitimacy theory also proposes that organizations will pursue certain actions and strategies to provide needed information in order to gain or maintain legitimacy when the provision of such information is critical to ensure their survival, as explained by Deegan (2002). The findings of an empirical study by Henriques and Sadorsky (1996) showed that firms' decision to adopt an environmental plan was positively impacted by the pressures of a community. In a similar vein, the study of Florida and Davison (2001) found that 85% of organizations adopted environmental management systems and pollution prevention programs in order to enhance community relations. This was one driving factor for those firms. Another study conducted by Raines (2002) showed that the firms' desire to be a good neighbour was one of the strongest motivations to pursue certification ISO 14001 in several countries.

Although the legitimacy considerations have been considered important in the research into environmental practices adoption, limited attention has been given to studying the impact of legitimacy considerations on EMA acceptance and adoption. Chang's (2007) study was the first attempt, made to investigate the relationship between legitimacy considerations and EMA adoption. His study found that the lack of legitimacy considerations; environmental responsibility and accountability played an important role in impeding EMA adoption. Therefore, the current study takes into account legitimacy considerations as an important factor in the environmental context, in an attempt to provide more explanations for its influence on organizations' intentions and their behaviors towards accepting and adopting EMA in Libya's oil and manufacturing sectors.



#### **2.5.3.4 Stakeholders Pressures**

Stakeholders pressures also appear to be of the dominant variables in the environmental management adoption studies (e.g. Azzone *et al.*, 1997; Bansal & Roth, 2000; Delmas & Toffel, 2004b; Henriques & Sadorsky, 1999). According to Delmas and Toffel (2004b), stakeholder groups in the community, such as customers, governments and environmental interest groups encourage organizations to include reducing environmental impacts in decision-making.

The literature shows that organizations would be more responsive to the demands of the stakeholder group if those groups were powerful or influential, and they would be less responsive to those demands if those groups were less powerful or influential (Belal & Cooper, 2007; Chang & Deegan, 2010; Deegan & Blomquist, 2006). It is argued that organizations can use information disclosure for gaining or maintaining the support from certain stakeholder groups. For instance, Deegan & Blomquist (2006) suggest that if any stakeholder group has concerns about environment-related impacts generated by organization activities, that organization may see a need to provide information on undertaken efforts and initiatives to mitigate its environmental impacts and to dispel the concerns of influential stakeholders.

Several studies have shown that stakeholders' pressures have stimulated organizations to adopt environmental initiatives and practices. For example, Bansal and Roth (2000) argue that stakeholder groups have been instrumental in enhancing corporations' environmental responsiveness. They found that the pressures of stakeholders were among the most influential motivations for firms to adopt environmental initiatives and practices. The empirical results of Henriques and Sadorsky (1996) showed that

customers' pressure and shareholders' pressure, positively influenced firms' decision to adopt an environmental plan in Canada. Christmann and Taylor (2001) also found that developed countries' customers had motivated firms in China to adopt the ISO14001 EMS standard and improve their environmental compliance. Delmas and Toffel (2004b), on the other hand, stated that government bodies represented the most obvious stakeholders that influenced the adoption of environmental practices in organizations. Kollman and Prakash (2002) found that the firm's decision to adopt environmental management practices was strongly influenced by pressures of stakeholders, who included regulators, suppliers, regional chambers of commerce, and industry associations. This is in line with stakeholder theory that proposes that firms tend to respond to demands of stakeholders if they exert strong pressures on their operations and resources, and firms ignore these demands when stakeholder pressures are weak or almost non-existent (Bouma & Kamp-Roelands, 2000; Burritt, 2005; Chang, 2007; Deegan & Blomquist, 2006).

In the context of EMA, several studies have indicated that the increase of stakeholder pressures is one of essential motivations for organizations to take interest in EMA practices, and it is also likely to influence the adoption of EMA practices within organizations. For example, the IFAC (2004) state that increasingly, the pressures from stakeholders such as the governments, employees, consumers, lenders, shareholders and investors have forced many companies to look for new, innovative and efficient tactics for managing and minimizing their environment-related impacts. On the other hand, Viere, Schaltegger, Herzig and Burritt (2006b) argue that organizations would not worry about environmental and sustainability issues in the absence of stakeholder pressures and thus, this situation may lead to limited

acceptance and adoption of EMA. According to Burritt (2005) and Chang (2007), EMA can be used as a tool to legitimise firms' internal operations, if there are pressures from influential stakeholder groups. However, in practice there is little empirical research examining the relationship between stakeholder pressures and EMA adoption (Ambe, 2007; Chang, 2007). For example, Ambe (2007) found that one of the stumbling blocks to the adoption and implementation of EMA practices was the lack of pressures from stakeholders. Conversely, the study of Chang (2007) showed that the stakeholder was not found to be among impacting factors in the adoption of EMA. Because of this conflict in the findings of previous studies, the present study considers stakeholder pressures, besides the importance of the factor for the acceptance and adoption of new technologies within the environmental context. Thus it is likely to have an impact on the organizations' intentions and willingness to adopt EMA in Libya's oil and manufacturing sectors.

#### **2.5.4 Review of Previous Literature related to the Technological Context**

Literature related to IT adoption (e.g. Alatawi *et al.*, 2012; Grover, 1993; Twati, 2007) indicates that factors in technological context that normally explain attributes of innovation would influence the adoption of organizational practices and innovations. Based on the TOE framework, technological context focuses on how the characteristics of technology themselves can affect the propensity and intention of firms to adopt technical and administrative innovations. The technological variables are many and varied, for example, perceived benefits, perceived importance, perceived barriers and the ability to adopt. They have been examined in the diffusion of innovations context (Chau & Tam, 1997; Oliveira & Martins, 2011; Tornatzky & Fleischer, 1990). These factors can facilitate or constrain acceptance and adoption of

innovations. Many previous studies have provided evidence to show the relationship between technological factors and innovations adoption (Oliveira & Martins, 2011).

Building on the literature related to the adoption of innovations and information technology (IT), two main variables in the technological context were selected and assumed to be the most suited for analyzing the EMA adoption process in both oil and manufacturing sectors in Libya. Technological variables, the focus of present study, are perceived benefits and perceived importance. These variables were chosen due to their importance and have been found to be among influencing factors on organizations' behavior to accept, adopt and use new techniques and information systems, as shown in several previous studies (e.g. Chai, Bagchi-Sen, Morrell, Rao & Upadhyaya, 2006; Chau & Tam, 1997; Janvrin, Bierstaker & Lowe, 2008; Kuan & Chau, 2001; Oliveira & Martins, 2011; Tsai & Tai, 2003; Twati, 2007). Therefore, it is expected that both perceived benefits and perceived importance of EMA also play an important role in the adoption of EMA.

Based on the technology acceptance model (TAM) by Davis (1986) and TOE framework by Tornatzky and Fleischer (1990), this study assesses the mediating role played by perceived benefits and perceived importance of EMA in firms within the two studied sectors. The firms in both sectors are similar in terms of EMA adoption, where they are not even at the awareness stage of EMA. Therefore, the assessment of perceived benefits and perceived importance of EMA would determine the existence of any relationship between independent variables from organizational and environmental contexts and the dependent variable in this study. To date, few studies have incorporated explicit characteristics on innovation, such as perceived benefits

and perceived importance in modeling the adoption of EMA. The current study is perhaps the first to examine the influence of two technological variables (perceived benefits and perceived importance of EMA) on firms' intentions to adopt EMA practices.

#### **2.5.4.1 Perceived Benefits of EMA**

Perceived benefits represent one of most important characteristics of innovation. According to Chau and Tam (1997), perceived benefits are mainly concerned with benefits capture, specifically, the extent of agreement with claimed benefits. Twati (2007) drawing on the TAM model states that perceived benefits (usefulness) refer to the level to which organizations or individuals perceive that system is beneficial or useful, to improve their performance. TAM assumes that perceived benefits describe a relationship between the acceptance, adoption and use of the system that explains a motivation for acceptance or rejection of IS/IT applications. Perceived benefits of usefulness impact the behavioral intentions of individuals in the adoption and use of the technique or system (Malhotra & Galletta, 1999).

The impact of perceived benefits on the innovation adoption process has been examined rather widely in IS/IT literature (Chau & Tam, 1997). Empirical research has consistently shown that perceived benefits have a significant influence on the adoption and use of IT (e.g. Beatty *et al.*, 2001; Chau & Tam, 2000; Iacovou, Benbasat & Dexter, 1995; Kuan & Chau, 2001; Oliveira & Martins, 2008; Twati, 2007). Chau and Tam (2000) for example, examined the relationship between perceived benefits and the decision to adopt open systems. They found that firms were

attracted or pushed to adopt open systems, due to perceived benefits of adopting that technique. Kuan and Chau (2001) also found that the perceived benefits of new technology significantly affected the adoption of electronic data interchange (EDI) in small businesses. On the other hand, Oliveira, Tiago and Martins (2008) found perceived benefits were more important to the adoption of websites for small organizations than those which were larger in size. Beatty *et al.* (2001) also provided evidence to show that perceived benefits affected the adoption and use of technology. Awareness of the potential benefits of technology is necessary in order to adopt such technology (Iacovou *et al.*, 1995). On the other hand, Twati (2007) using the TAM model investigated the mediating role of perceived benefits in the relationship between social and organizational culture and adoption of management information systems (MIS). The findings revealed that perceived benefits mediated the relationship between social culture and adoption of MIS, as well as between hierarchy organizational culture type and MIS adoption.

EMA, in relation to a specific organizational context, can provide several benefits, as indicated by a number of researchers (Beer & Friend, 2006; Bennett *et al.*, 2003; Burritt *et al.*, 2002; Ferreira *et al.*, 2010; IFAC, 2005). It is advocated that EMA can help to reduce environmental impacts, improve an organization's performance, better utilize resources, reduce total costs, improve product pricing, attract human-resources, improve an organization's reputation, and offer useful information for decision making at different levels (Burritt *et al.*, 2002; Ferreira *et al.*, 2010; IFAC, 2005; Jasch, 2003, 2006a). Yet, despite findings showing that perceived benefits played a vital role in the adoption of technologies and information systems in IS/IT literature, the influence of perceived benefits in the level of EMA adoption has not examined.

To date, the impact of perceived benefits on behavioral intention to adopt EMA has not yet been examined in depth. This study may be the first of its kind to examine the influence of perceived benefits on the adoption of EMA. In this research, a perceived benefit is projected to be the mediator factor in the technological context, and this study examines its mediation influence to more fully explain the firms' intentions to adopt EMA in the Libyan context.

#### **2.5.4.2 Perceived Importance of EMA**

Another important characteristic of innovation is perceived importance. The impact of perceived importance on the adoption of innovation has been suggested in IS/IT literature. Perceived importance refers to the degree to which people perceive that system is necessary and important to enhance performance (Cohen, 1990). According to Chau and Tam (1997), the adoption of a new technology is based on perception, specifically if it is perceived as better than current technology used in an organization, and this is closely related to the degree of perceived importance. Thus, people who do not see much gain from having information technology will not be enthusiastic to adopt such technology. Chau and Tam (1997), further argue that the degree of perceived importance will not be identical, due to different opportunities and constraints facing each organization.

Few studies have examined the influence of perceived importance in decision making and behavior intentions of individuals concerning IT adoption and use (Chai *et al.*, 2006; ChanLin, 2007; Chau & Tam, 1997; Janvrin *et al.*, 2008; Leonard, Cronan & Kreie, 2004; Oliveira & Martins, 2011). The study of Chai *et al.* (2006), for example, examined factors that motivated students' behavior regarding information security on

the internet. The study found that perceived importance of information security played an important role in influencing students' behavior towards information security. Chau and Tam (1997) for example, found moderate support for the relationship between perceived importance of open systems and adoption behavior of open systems. Chan Lin (2007) also studied the impact of teachers' perceived importance of technology on integrating computer technologies within classrooms. The results showed that there was a significant relationship between computer use by teachers and the perceived importance of integrating technology into the classrooms. Janvrin *et al.* (2008) explored the relationship between the use of audit IT and the perceived importance of IT across numerous applications of audit. Findings suggest that auditors perceive the importance of several applications; however, these applications were used infrequently in audit.

In addition, audit IT use and the perceived importance of IT were found to vary by organization size. Leonard *et al.* (2004) found a significant difference between perceived importance and on the intent to behave. In another context, Tsai & Tai found that the perceived importance of a training program for trainees was found to impact trainees' motivation for training. Their findings further showed that perceived importance mediated the relationship between training assignment and motivation of training. This confirms the results provided by Cohen (1990) and Clark *et al.* (1993) who found that the motivation of trainees for training programs would be enhanced if they felt that programs were necessary or beneficial. Such findings showing that perceived importance had a significant impact on behavioral intention, in turn would affect adoption behavior. This supports an argument that the adoption of new technologies is closely associated with the perceived importance of technology, as



proposed by Chau and Tam (1997). In other words, if individuals believe that the technology, program or practice is beneficial and important, their motivations to adopt it will increase. However, further evidence is required in order to confirm such claims and results.

In a similar vein, it is argued that it is crucial for organizations to adopt EMA due to its importance for obtaining legitimacy and survival (Burritt, 2005; Delmas & Toffel, 2004b; Delmas & Toffel, 2008; Florida & Davison, 2001; Hoffman, 2001; Prakash, 2001; Summers, 2002). The adoption and use of EMA can provide useful and important information to assist firms to expose hidden opportunities, offer more choices to manage wastes, reduce material consumption and energy, recycle materials, and achieve eco-efficiency, leading to the reduction of environmental costs and impacts. This in turn would positively affect the position of a firm in the society and maintain its legitimacy and support its survival (Ferreira *et al.*, 2010; IFAC, 2005). Building on the above discussion, it is argued that the motivation of organizations to adopt EMA practices will be enhanced if they believe that practices are necessary or beneficial for their legitimacy and survival.

Despite the vital role of perceived importance in the adoption of EMA, the effect of perceived importance at the level of EMA adoption has not yet examined. To date, research has not addressed the relationship between perceived importance and the behavioral intention to adopt EMA in depth. The present study may be the first of its kind to examine the effect of perceived importance on the adoption of EMA. This research attempts to examine the mediating role that perceived importance plays in

the relationship between both organizational and environmental variables and the intention to adopt EMA.

## **2.6 Theories related to EMA Adoption**

This section highlights the contingency theory, institution theory, stakeholder theory, legitimacy theory, as well as the diffusion of innovation theory (DOI). Furthermore, the technology acceptance model (TAM), and technology, organization and environment framework (TOE) are also discussed. These theories and models can provide guidance, a logical basis and some theoretical perspectives for this study to explain the adoption process of EMA and throw light on the potential factors affecting the adoption and spread of EMA practices within organizations in specific contexts.

### **2.6.1 Contingency Theory**

A literature review shows that contingency theory has been used in accounting research and might be associated with EMA. The contingency theory was adopted as a significant foundation to accounting research in the 1970s. In fact, the focus in accounting research was mainly on accounting systems design. Many studies were designed to identify the best contingencies to establish a comprehensive framework for management accounting systems design (e.g. Bruns & Waterhouse, 1975; Chenhall & Morris, 1986; Gordon & Miller, 1976; Hayes, 1977; Otley, 1980; Waterhouse & Tiessen, 1978).

However, the impact of contingencies on organizational subunits varies, helping to explain the differences in regard to management accounting systems of organizations,

as indicated by Waterhouse and Tiessen (1978). Rayburn & Rayburn (1991) argue that there is no universal design of accounting systems that is appropriate for all organizations in all circumstances (Reid & Smith, 2000). Related accounting literature suggests a number of contingent variables influence the design of effective systems in relation to management accounting. The key contingent variables include the management style, production technology, organizational structure, and environmental conditions (e.g. Chenhall & Morris, 1986; Chong, 1996; Gordon & Miller, 1976; Govindarajan, 1988; Gul & Chia, 1994; Merchant, 1981; Reid & Smith, 2000).

More recently, contingency-based research suggests that business strategy can also be one of important variables that has an impact on the design of accounting information systems (Abernethy & Guthrie, 1994; Chenhall, 2005; Chenhall & Langfield-Smith, 1998). there is also another stream of research that focuses on the use of contingency factors to explain the relationship between enhancing organizational performance and design of accounting information systems (Otley, 1980). Many of these variables can be relevant to EMA adoption, and thus were utilized to develop set hypothesis related to this study.

In the EMA context, the contingency theory stresses efficiency as the reason for EMA adoption, which would eventually lead to improving corporate performance (Chang, 2007; Rikhardsson *et al.*, 2005). Rikhardsson *et al.* (2005) further suggest that EMA is a new managerial innovation, and thus the efficient choice can be used as one of main explanations in innovation literature to explain drivers or reasons for the adoption of certain technologies by firms (Abrahamson, 1991, 1996). For example,

some EMA techniques were adopted in the United States due to their contribution to cost savings, providing measurable advantages, or are considered more economically efficient.

In this regard, the increase of environmental regulations in the United States would push a number of firms to apply EMA tools in order to achieve profits or cost savings and avoid contingent liabilities in future, by reducing environmental impacts (Chang, 2007; Gray & Bebbington, 2001). From the above discussion, it seems that the contingency theory provides an important explanation for EMA adoption as suggested by number of researchers (e.g. Bouma & Van der Veen, 2002; Chang, 2007; Chang & Deegan, 2010; Osborn, 2005). However, very few empirical studies have attempted to explore the influence of contingency factors on EMA adoption within organizations so far, and findings have been mixed. Moreover, Chang (2007) argues that there are many factors, including contingency factors, which may affect EMA adoption but remain unexplored. Therefore, this research examines the impact of a number of contingency factors on the intention of firms to accept and adopt EMA practices. These factors may include business strategy, organizational structure, and organizational culture, which still need further investigation.

### **2.6.2 Institutional Theory**

Institutional theory has been used in accounting studies and can provide another explanation for EMA adoption. According to Chang (2007), institutional theory emphasizes the impact of external groups and imitation processes on the adoption of EMA. Rikhardsson *et al.* (2005) argue that institutional explanations basically depend on the sociological or psychological factors that have an essential influence on

decision-making in regard to undertaking changes or developments of accounting systems.

Institutional theory focuses on the influences of institutional environments on an organization in contrast to contingency theory that focuses on technical environments as argued by Chang (2007). Institutional environments are characterized by rules and requirements that are imposed on firms, which must comply with these rules and requirements to enjoy support and legitimacy by society (Scott & Meyer, 1983). According to Bouma and Van der Veen (2002), the institutional perspective emphasizes the impacts of social, economic and political institutions on an organization's behaviour.

DiMaggio and Powell (1983), and Meyer and Rowan (1977) argue that the motivation for organizational changes might be because of the need to obtain legitimacy and maintain survival rather than to be competitive and improve performance. Number of studies in accounting show that organizations have adopted and used accounting practices or techniques to legitimize their operations and ensure survival in the society (Burns & Scapens, 2000; Carmona & Macias, 2001; Markus & Pfeffer, 1983; Mir & Rahaman, 2005). For example, Mir and Rahaman (2005) found that institutional legitimacy is one of main factors that drive the decision to adopt accountancy techniques and standards due to the pressures exerted by institutions. Chang (2007) indicates that change in the institutional environment of an organization might lead to homogeneity or isomorphism, which in turn motivates or hampers the adoption of new innovations and practices, including those related to accountancy. DiMaggio and Powell (1983) developed a classification to identify the processes leading to

institutional isomorphism. They suggest the coercive, mimetic, and normative mechanisms, to bring about organizational changes.

Coercive isomorphism is mainly derived from political and legal influences exerted on organizations from institutions dependent on them for getting resources and survival, as well as, from social expectations of organizations that lead to them to adopt certain attributes to gain legitimacy of their operations. For example, organizations operating in the public sector tend to conform to policies and requirements issued by the government, due to their dependence on financial support provided by the government for their survival. As such, an organization may change its systems to conform to government's policies to obtain legitimacy or guarantee funding support, for example, organizations may adopt new technologies for pollution control to comply with environmental regulations (DiMaggio & Powell, 1983).

Normative isomorphism basically leads to professionalization, which may occur by the creation of professional bodies or formal education, two key instruments driving changes to professional behaviour and organisational practices (DiMaggio & Powell, 1983).

Mimetic isomorphism mainly stems from imitating organizations to face uncertain circumstances. Organizations in situations of uncertainty tend to imitate other organizations to gain legitimacy or to be successful. Many organizational applications are spread because of imitation processes, rather than the need to improve organization-efficiency, according to DiMaggio and Powell (1983). For example,

Abernathy and Chua (1996) found that the concept of zero-based budgeting is applied in public sector organizations, although it basically originated in the private sector.

In accounting literature, the three categories of institutional isomorphism have been documented. It is argued that for analytical purposes, the sharp distinction between the three types may be difficult (Modell, 2002). In this context, Oliver (1991) argues that the organizational responses for institutional pressures may vary according to the context and the nature of these pressures. Coercive pressure stems from legal and governmental pressures, or voluntary diffusion stems from mimetic or normative pressures. Building on Oliver's definition, the three types in some conditions might co-exist and not be mutually exclusive. The literature indicates that institutional theory provides valuable insights into sustainability and accounting research (e.g. Ahmed & Scapens, 2000; Jennings & Zandbergen, 1995; Lapsley, 1994; Loft, 1986; Malmi, 1999; Modell, 2002; Moll, 2003). For example, Moll (2003) uses institutional theory to explain accounting changes that may occur through public sector reform. Jennings and Zandbergen (1995) adopt institutional theory to explain how to create and adopt sustainability programs and related practices within organizations. Modell (2002) observes that institutional factors influence cost allocation practices within organizations. Bjornenak (1997a) argues that there is an influence of normative and mimetic pressures on the adoption of cost allocation techniques in organizations.

The study conducted by Bansal and Roth (2000) found that the ecological responsibility, legitimating, and competitiveness were among important motivations that encouraged organizational responsiveness and changes. Bansal and Roth (2000) also argue that the adoption of green initiatives are diverse and intricate and are

influenced by surrounding institutions where organizations are operating. In the EMA context, institutional theory emphasises the adoption of EMA associated with the processes of imitation and external groups such as accounting professional bodies and governmental agencies (Chang, 2007). Many researchers suggest that institutional theory can provide a significant explanation for EMA adoption (e.g. Bouma & Correlje, 2003; Bouma & Van der Veen, 2002; Chang, 2007; Osborn, 2005; Qian, W & Burritt, 2009; Rikhardsson *et al.*, 2005), depending on the argument that changes in surrounding institutional environments can motivate or hinder the introduction of organizational changes or adoption of new practices and innovations including accounting techniques within firms. For example, governmental guidelines in Japan greatly contributed to the introduction of EMA practices in several companies. According to Kokubu and Nakajima (2004), a high percentage of Japanese firms follow government guidelines in reporting environmental information, leading to the introduction of EMA practices in response to the demands or pressures of governmental agencies. Thus, it seems that the institutional theory can provide an important explanation in relation to EMA adoption.

Building on the above discussion of institutional theory, this study examines the influence of institutional factors on EMA adoption as suggested by DiMaggio and Powell (1983). This process may be affected by one type, or more institutional pressures. It is argued that, the existence of institutional pressures may influence firms to accept and adopt EMA practices, especially when the benefits that can be gained by EMA adoption are not easily visible (Chang, 2007; Viere *et al.*, 2006b). Thus, the level of institutional pressures can facilitate or impede the adoption of EMA in a given organization or country. On this basis, it is argued that institutional theory



provides an important explanation in regard to EMA adoption in certain contexts or certain environments. However, very few empirical studies have examined the influence of institutional factors on EMA adoption. For example, Chang (2007) who adopted the case study approach in the study recommended further research to highlight the impact of institutional factors on EMA adoption within firms operating in different contexts or other environments.

Building on the discussion earlier, this research examines the relationship between institutional factors and EMA adoption in Libya, developing country. These factors include coercive pressures exerted by the government and legislations, and normative pressures exerted by professional bodies and formal education that may affect the intention of firms to adopt EMA. This study has excluded imitation pressures because of the stable Libyan environment, as suggested by Twati (2007). According to DiMaggio and Powell (1983), organizations in this position tend not to imitate other organizations.

### **2.6.3 Legitimacy Theory**

Literature related to environmental accounting also demonstrates that legitimacy theory might be associated with EMA research. Several researchers argue that legitimacy theory provides important perspectives to provide reasons for disclosure on certain information by organizations to other parties voluntarily (Deegan, 2002; Deegan & Blomquist, 2006; Gray, Kouhy & Lavers, 1995b; Roberts, 1992). According to Chang (2007), legitimacy theory emphasises that the main objective of firms is getting a good reputation by operating among the society's bounds and norms.

From the view of Deegan (2002), legitimacy theory suggests that organizations will pursue certain actions or apply strategies to provide particular information for gaining or maintaining the legitimacy when the provision of such information is critical to ensure their survival. Legitimacy theory assumes that organizations must respond to the needs of the society in order to retain their legitimacy and to satisfy stakeholders, as stated by a number of researchers (Cho & Patten, 2007; Patten, 1991, 1992, 2002; Patten & Crampton, 2003). It is argued that, the behavior of organizations towards their surrounding environment must continually evolve to adapt to change in wishes and expectations of the community in order to maintain their survival (Sethi, 1974). Many studies have used legitimacy theory to explain environmental disclosure among organizations (e.g. Adams, Hill & Roberts, 1998; Ahmad, 2004; Cho & Patten, 2007; Deegan, 2002; Deegan & Gordon, 1996; Gray, Kouhy & Lavers, 1995a; Patten, 1991, 1992; Patten & Crampton, 2003; Wilmshurst & Frost, 2000). These studies indicate that firms can disclose environmental information either to anticipate, or avoid pressures from the stakeholders, or, they might do so to enhance their standing and image in the society.

Thus, from this viewpoint, EMA can boost organizations' reputation and legitimise their operations through provision of required information on environmental performance for internal and external parties, and its role in managing environmental impacts resulting from activities of organizations (Chang, 2007; Ferreira *et al.*, 2010). According to Chang (2007), it is feasible that organizations may seek to adopt EMA as a means to legitimize their operations, or to administer their environmental impacts to respond to demands and pressures of stakeholders, and to be highly regarded by

society. Building on the above discussion, it is argued that legitimacy theory can be used to explain EMA adoption.

#### **2.6.4 Stakeholder Theory**

Stakeholder theory can also provide another perspective to explain EMA adoption. The literature related to environmental accounting also demonstrates that stakeholder theory may be related to the adoption of EMA. Researchers argue that stakeholder theory provides important perspectives to explain the reasons for voluntarily disclosing information related to the performance of organizations (Deegan, 2002; Deegan & Blomquist, 2006; Gray *et al.*, 1995b; Roberts, 1992). It is argued, that there is much overlap between legitimacy theory and stakeholder theory, and thus it will be wrong to consider them separate theories (Deegan & Blomquist, 2006).

According to the stakeholders' perspective, organizations tend to respond to demands of powerful stakeholders, who exert strong influence on their operations, or control their resources, and they will ignore these demands, when groups without power or influence exist (Bouma & Kamp-Roelands, 2000; Burritt, 2005; Chang, 2007; Deegan & Blomquist, 2006). Freeman (1994) defines stakeholders as "any group or individual who is affected by or can affect the achievement of a firm's objectives". According to Chang (2007), stakeholder theory asserts that the management in organizations are impacted by the power of the stakeholders who control required resources of their operations.

Stakeholder theory offers interpretations on why or how organizations respond to stakeholders in a given method. These interpretations are consistent with two

branches of stakeholder theory that have appeared in the literature. These are ethical and managerial branches, as stated by some of the researchers (Belal, 2002; Deegan, 2002; Wilmshurst, 2006). The ethical or normative perspective stresses the need to achieve balance in dealing with various stakeholders' interests and rights, regardless of the strength of each, because all stakeholders have equal rights in terms of the handling, and also it is the correct thing to do, whereas the managerial perspective focuses on handling influential stakeholders groups (see for example, Berman, Wicks, Kotha & Jones, 1999; Freeman, 1994; Gray, Owen & Adams, 1996; Phillips, Freeman & Wicks, 2003). Both perspectives emphasize the importance of providing information by organizations to stakeholders. It is argued that, information provided can be used for getting or preserving the support of stakeholders group, and it is also the right thing to do, whereas lack of required information provided by organizations to stakeholders may impact their survival (Chang, 2007). Deegan and Blomquist (2006) argue that organizations, for example, may see a necessity to offer information on their efforts and programmes taken to reduce the environmental impacts in order to mitigate concerns of the influential or powerful stakeholders groups, if these groups are interested in the environmental impacts of organizations.

Bansal and Roth (2000) provide empirically support for the motivations of firms to adopt initiatives to reduce their environmental impacts. They found that organizations that focused upon stakeholder group were the most influential to express concerns of legitimacy. Their findings also showed that legitimacy may include compliance with legislation, creation of environment-related committees, or appointment of environmental managers, implementation of environmental audits, and alignment of the organization with advocates on environment.

In this regard, EMA can be used as a tool to legitimize internal practices of the organization, if there are pressures from influential stakeholder groups (Burritt, 2005; Chang, 2007). According to the above discussion, it is argued that stakeholder theory can also be adopted to provide forecasts or explanations for EMA adoption. Therefore, organizations can be more willing to adopt EMA for managing their environmental impacts or improving their environmental performance when pressures come from different stakeholders.

### **2.6.5 Diffusion of Innovation Theory (DOI)**

Theory of innovation diffusion (DOI) has been utilized to study issues related to the adoption, implementation and diffusion of innovation by many researchers in various contexts (Oliveira & Martins, 2011; Rikhardsson *et al.*, 2005). This theory focuses on the perceptions of potential users of innovation, the impact of its adoption and the spread of technology and new ideas through societies, and degrees of willingness to adopt innovations (Rogers, 1995). The words 'technology' and 'innovation' are often used as synonyms (Rogers, 2003).

Rogers (1995) argues that an innovation does not totally refer to a new product or new technology, but it can be a practice, idea, or object that is perceived as new by individuals or other parties such as organizations or society. The issues of innovation, acceptance, adoption, and implementation have existed in information systems (IS) literature for over four decades. Different theories and models have been developed by researchers to measure the diffusion and acceptance of innovations and technology from various angles (Davis, 1986; Geroski, 2000; Rikhardsson *et al.*, 2005; Rogers, 2003). The diffusion of innovation theory was developed by Rogers (1983), and is

widely cited and used in the IS literature. Rogers (2003, p. 11) defines diffusion theory as “the process by which an innovation is communicated through certain channels over time among the members of a social system”. He claims that adoption is a decision to make full use of an innovation as the best course of action available, whereas rejection of a decision is not adopting the innovation or the technology. Rogers (1995, p. 14) claims that the innovation-decision process is “essentially an information-seeking and information-processing activity in which an individual is motivated to reduce uncertainty about the advantages and disadvantages”. According to Rikhardsson *et al.* (2005, p. 2), EMA is a form of innovation or technology. They claim that EMA represents “a managerial technology which combines knowledge, methodology and practice applied to environmental management and economic results”. According to Tushman and Anderson (1986), managerial technologies can be defined as “those tools, devices and knowledge that mediate between inputs and outputs”, as cited by Abrahamson (1991).

As indicated by Rikhardsson *et al.* (2005), EMA incorporates various techniques and tools that collect, analyze and communicate certain information. Therefore, it is a type of managerial technology or information management technology. These tools and techniques include environmental cost accounting (ECA) to manage material flow, budgeting, investment appraisal, and performance measurement (Burritt *et al.*, 2002; Burritt, Hahn & Schaltegger, 2004; Schaltegger & Burritt, 2000). As such, these tools and technologies are comparable with other managerial technologies and tools such as quality management techniques, or tools of activity-based costing. Thus, it is argued that EMA, like other innovations, has an innovation cycle that includes invention, diffusion and adoption and rejection patterns. Moreover, the relevance of EMA might

differ from organization to organization. As a result, some organizations will decide to adopt it for its relevance, while some will not, in spite of this importance. Therefore, discussions about the adoption of EMA concentrate on the adoption of certain managerial practices and certain ideas rather than physical objects (Rikhardsson *et al.*, 2005).

In management information systems, adoption is frequently utilized as a term to describe a well-defined project that spans from the stage of becoming aware of innovation, to selection of system, and then through to the configuration, training and eventual going live, where the system becomes functional. According to Rogers (2003), the adoption process pertains to an individual, whereas the diffusion process within a society, refers to a group process. He defines the adoption process of innovation “as a mental process through which individual passes from first knowledge of an innovation to a decision to adopt or reject and confirmation this decision”, and the diffusion process as “the spread of a new idea from its source innovation or creation to its ultimate users or adopters” (Rogers, 2003, p. 99 to 150). Rogers (1995, p. 162 to 186) breaks down the adoption process of innovation into five stages through which an individual or organization, as an adopter, passes from first knowledge of the innovation to forming attitudes toward the innovation, to making the decision to adopt or reject, to implementation of the managerial innovation and confirmation of this decision. The five stages are discussed below:

1. **The knowledge:** The adopters at the first stage become aware of an innovation through different sources available in the social system;

2. **Persuasion stage:** The adopter becomes interested in the innovation and develops mental acceptance, or makes a decision to reject this innovation;
3. **Decision stage:** The adopter engages in activities that lead to a choice to adopt or reject the managerial innovation. This is the feasibility stage where the adopter assesses the benefits of innovation and its expected situation in the future, then decides whether or not implement it;
4. **Implementation stage:** The adopter makes full use and applies new techniques on a small or full scale in order to determine its utility in his/her own situation; and;
5. **Confirmation stage:** The adopter at the last stage of the innovation adoption process seeks support for the innovation-decision already made at the previous stages and utilizes the new techniques continuously, full-scale and applies any improvements for upgrades.

The adoption process of EMA varies greatly among organizations in different countries compared with the process described above. Evidence shows that some organizations in developed countries are at the implementation or adoption stage, while most of organizations in other countries in particular, in developing countries are not yet even at the awareness stage regarding EMA (Burritt, 2004). This precedes the knowledge stage of Rogers' adoption process of innovation (Twati, 2007). This is what is indicated by Ferreira *et al.* (2010) who argue that EMA is still at an early stage of adoption and implementation. There are various factors impacting this variation between organizations as well as countries. Based on the DOI theory, the innovation adoption process can be affected by individual characteristics, internal and external characteristics of the firms (Rogers, 1995). This study proposes numerous



factors from three contexts - organizational; environmental and technological - which are among the factors impacting or impeding some organizations in some countries from making use of the latest technological innovations and adopting EMA. DOI theory can provide a logical basis for dealing with the adoption process of EMA and the selection of the factors located in these different contexts.

### **2.6.6 Technology Acceptance Model (TAM)**

The technology acceptance model (TAM) developed by Davis (1986) seeks to assess the values, reactions, perceived benefits and ease of use of the system. The main idea of TAM is grounded, based on the theory of reasoned action (TRA) which suggests that attitudes lead to intentions, which then guide or generate behaviors (Hu, Chau, Sheng & Tam, 1999). The TAM model is widely used in innovation literature as an explanatory tool for individuals' reactions to the use of technology across many areas. It is valid and reliable, and can easily be adapted to conduct research into the innovation or managerial technology areas. This model aims to explain determinants of the computer acceptance and explain a broad range of end user behavior across computing technologies, while also being both economically and theoretically justified (Davis & Venkatesh, 1996).

The TAM model evaluates the use of information technology based on the impact of the main variables: the perceived usefulness, perceived ease of use, user's attitude, behavioral intentions and the actual system use behavior. The TAM model proposes that variables describe a relationship with technique use by explaining an incentive, the acceptance or rejection of the innovation, system, or technique by people. The reliability of TAM model has motivated many researchers to use it to investigate

technology adoption and human reaction to technology. For example, this model has been adopted by many studies to examine the adoption of various IT/ IS systems, such as the adoption of management information systems (Twati, 2007); e-commerce adoption (Wang & Ahmed, 2009); the adoption of e-government (Lau, Aboulhosen, Lin & Atkin, 2008) and the adoption of e-government services (Horst, Kuttschreuter & Gutteling, 2007). Thus, the TAM model can be used to deal with EMA adoption as it is a managerial technology. However, a small number of studies attempted to employ TAM model to measure adoption process of EMA. In the context of this study, TAM model was adapted and used as a guiding framework to link the variables of this study and make some changes to make it compatible with the EMA adoption.

#### **2.6.7 The Technology, Organization, and Environment Framework (TOE)**

A model for EMA adoption needs to consider the factors that influence the propensity to adopt and the specific organizational, environmental and technological contexts of an organization. There view of adoption literature indicates that TOE framework developed by Tornatzky and Fleischer (1990) might offer a useful preliminary point to assess the importance of various factors that influence the propensity to adopt EMA as it highlights the specific context where the adoption process takes place. This framework has been used for studying technological innovation adoption, at the organizational level. It can be used to discuss the research of the innovation adoption process at the firm level (Alatawi *et al.*, 2012; Chau & Tam, 1997). There are three elements in the TOE framework as suggested by Tornatzky and Fleischer (1990), which include: (1) technological context, that focuses on the characteristics of technology, how they can affect the adoption process, such as the perceived benefits, perceived importance, perceived barriers and ability to adopt, (2) the organizational

context that describes a firm's characteristics such as the strategy type, culture, size, the degree of formalization, complexity, centralization in its organizational structure, and (3) the environmental context, that represents the scope in which an organization conducts its business, such as regulations, competitors, industry and relations with the government or community (Chau & Tam, 1997). The different factors from technological, organizational and environmental context can facilitate or constrain adoption of innovation. Many previous studies have provided evidence of the relations between these factors and innovations (Oliveira & Martins, 2011). TOE framework has been used successfully across various studies in IT adoption literature in general, for example, the adoption of open system (Chau & Tam, 1997); EDI adoption (Kuan & Chau, 2001); KM systems adoption (Alatawi *et al.*, 2012) and e-commerce adoption (Seyal & Rahman, 2003).

A number of studies utilized the TOE as a common framework together with other theories such as institutional or the diffusion of innovation (DOI) theory (Alatawi *et al.*, 2012; Oliveira & Martins, 2011). This is due to the fact that TOE covers three contexts (technological organizational and environmental) for analyzing the adoption process of EMA. Thus, this framework offers a comprehensive analysis of different aspects that may be considered when investigating the adoption process of EMA practices in organizations in the oil and manufacturing sectors in Libya. The above discussion shows an important theoretical perspective as well as satisfactory empirical validations. A TOE framework has been deemed relevant to adopt for this study, as it will offer the suitable organizational, environmental, and technological contexts for the firms in the oil and manufacturing sectors. Moreover, based on previous research related to IS/IT adoption in general, and EMA adoption in particular, it was decided to

use the contingency theory, the institutional theory; the legitimacy theory; the stakeholder theory, DOI theory and TAM framework to describe the organizational, technological, and environmental contexts of the research framework of this study. Using the contingency theory in the organizational context of the TOE framework was motivated by the fact it has been used consistently in studies that investigated organizational adoption, and it provides an important perspective for explaining organizational behavior in EMA adoption, whereas institutional theory; legitimacy theory, and stakeholder theory have been used to analyze the environmental context due to the fact that no organization works in isolation.

These theories provide important explanations concerning external pressures that might influence decision-making and the behavior of organizations toward many issues related to the adoption of innovations in general, and environmental systems and practices in particular. In addition, as mentioned earlier, they provide important justifications for analyzing the adoption process of EMA. The TAM model is used to describe the technological context because it is the most widely used in IT/IS research. The use of DOI theory in the TOE framework is motivated by the fact that it is consistent with this theory (Oliveira & Martins, 2011), where DOI theory focuses on the influence of individual characteristics, as well as internal and external characteristics of a firm on the adoption of innovation (Rogers, 1995). In addition, the theory of Rogers's innovation diffusion describes the intra-organization innovation diffusion context in a better way (Hsu, Kraemer & Dunkle, 2006). Therefore, the present study uses the TOE framework supplemented by the TAM model and contingency theory; institutional theory; legitimacy theory; stakeholder theory and diffusion of innovation theory.

In conclusion, this research uses theoretical perspectives derived from various theories and models to develop the research framework of this study to understand and examine the factors which may influence the intention and decision of organizations to adopt EMA practices in the oil and manufacturing sectors in Libya. Given that EMA is a relatively new area in literature, this study examines the factors that may influence the adoption of EMA within organizations in Libya. This is a first attempt as Libya, a developing country, is characterized by different political, economic and social environments, in contrast to developed countries, where the majority of EMA studies were conducted. Therefore, this research seeks to bridge this gap in the literature by focusing on Libyan organizations as the unexplored research site so far in the research relevant to EMA adoption.

## **2.7 Chapter Summary**

This chapter has reviewed relevant literature in order to understand and provide an adequate background to EMA and the factors that may influence its adoption process. The chapter has also discussed the application of relevant theories, including contingency theory, the institutional theory; the legitimacy theory; the stakeholder theory, the diffusion of innovation theory and the TAM and TOE frameworks in the adoption of EMA and IT/IS disciplines. The comprehensive review work done on both EMA and IT/IS adoptions have provided an understanding of the factors that may influence the adoption of EMA. The review has also highlighted issues that have been identified and addressed by researchers regarding EMA adoption. These issues have been explored to develop the theoretical framework of this research. Chapter Three provides more details on the theoretical framework of the present research.

## **CHAPTER THREE**

### **RESEARCH FRAMEWORK AND METHODOLOGY**

#### **3.1 Introduction**

The previous chapter has carefully reviewed studies related to EMA and related organizational adoptions of innovations and technology. This chapter describes the research framework employed to determine the relationships between the variables in this research. The research variables are categorized into three main contexts: organizational, environmental and technological contexts. This chapter also presents and discusses the research hypotheses. The procedures to investigate the relationship between different research variables are also described. The procedures consist of the research design, research strategy, research population, sampling procedures and the development of an instrument for this study.

#### **3.2 Research Model**

The research framework was developed based on the questions and hypotheses of the research, drawing on theories developed by several researchers (e.g. the diffusion theory; contingency theory; institution theory; legitimacy theory and stakeholder theory). Moreover, the work of Davis (1986), and Tornatzky and Fleischer (1990) on the adoption process of organizational practices, technology and innovation was also used to support the research model. Davis (1986) developed a technology acceptance model (TAM) which distinguishes between adoption phases, classified into two: intention to adopt and actual adoption phase. Tornatzky and Fleischer's (1990)

technology, organization and environment (TOE) framework categorizes the factors that may impact the adoption process of innovation into three main contexts, namely; the technological, organizational and environmental context. Figure 3.1 shows the overall relationship between the independent and dependent variables investigated in this study. The research model is presented later in detail in Section 3.3 after all the research variables have been explained.

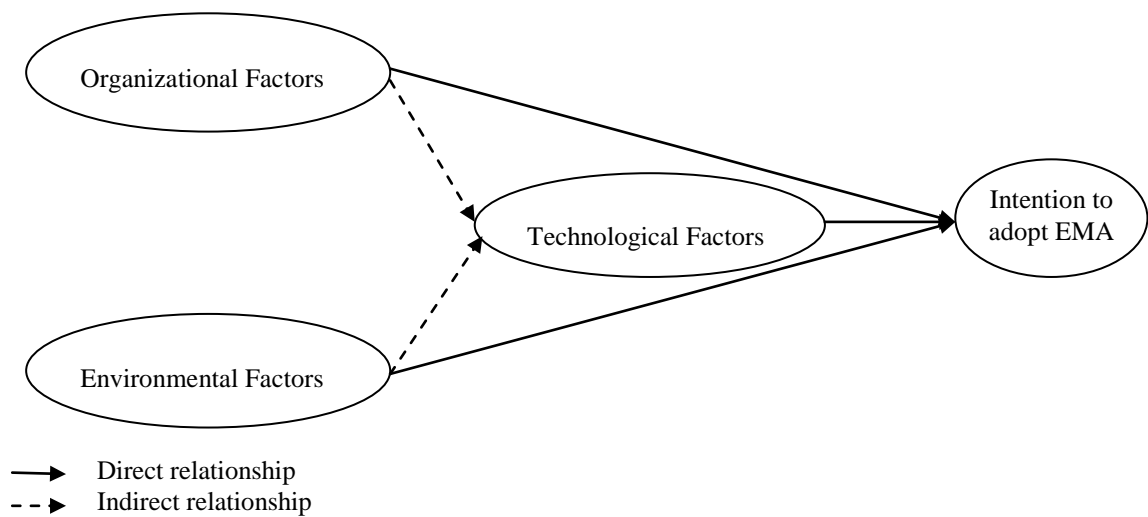


Figure 3.1  
*The Outline of the Conceptual Research Model for the Study*

### 3.3 Main Variables

The main motivation for the study was to examine EMA adoption in organizations in the oil and manufacturing sectors in Libya. This study examined the variables in the organizational, environmental and technological contexts, which may influence firms' intention or willingness to adopt EMA. The variables from the organizational context were business strategy, nature of formalization, organizational culture, and top management support, while the variables from the environmental context were

coercive pressure, normative pressures, legitimacy considerations, and stakeholder pressures. In addition, this study examined the influence of the perceived benefits and perceived importance of EMA from the technological context as mediator variables. The selection of these variables in three different contexts was based on many studies in the literature related to EMA and innovations.

### **3.3.1 Intention to Adopt Environmental Management Accounting**

The intention to adopt EMA was used as the dependent variable in this research rather than actual adoption to examine the acceptance and adoption of EMA. This decision was made primarily because the adoption and implementation of EMA is still at an early development stage, as discussed in Chapter Two by several researchers (e.g. Christ & Burritt, 2013; Ferreira *et al.*, 2010; Rikhardsson *et al.*, 2005).

In addition, a number of previous studies (e.g. Hu *et al.*, 1999; Khalifa & Ning Shen, 2008; Leonard *et al.*, 2004; Sheppard, Hartwick & Warshaw, 1988; Szajna, 1996) have empirically justified the use of behavioral intention as the dependent variable due to the strong and significant causal link between behavioral intention and actual behavior. According to Sheppard *et al.* (1988, p. 325), “a behavioral intention measure will predict the performance of any voluntary act, unless intent changes prior to performance or unless the intention measure does not correspond to the behavioral criterion in terms of action, target, context, time-frame and/or specificity”. On the other hand, Hu *et al.* (1999) state that the acceptance of technology can be defined as “an individual’s psychological state with regard to his or her voluntary or intended use of a particular technology.”



The terms EMA was developed and used in the 1990s. As discussed in Chapter One, EMA, as an important development of management accounting systems, represents one of recent innovations in management accounting that can help firms in improving both economic and environmental performance and thus, help to achieve sustainability (Schaltegger, Bennett & Burritt, 2006). Some of researchers indicate that sustainable development in many firms has become one of goals to achieve, enhancing their intention to adopt and use the practices of EMA (Ferreira *et al.*, 2010; Figge, Hahn, Schaltegger & Wagner, 2002).

Relevant literature review, as shown in Chapter Two, indicates that the potential benefits of EMA adoption and use are numerous and varied (Beer & Friend, 2006; Bennett *et al.*, 2003; Burritt *et al.*, 2002; IFAC, 2005). However, even though EMA has benefits, the acceptance, adoption and use of EMA is still weak specially in developing countries (Ambe, 2007; Burritt, 2004; Chang, 2007, 2013; Chang & Deegan, 2010; Christ & Burritt, 2013; IFAC, 2005).

In addition, as discussed in Chapter Two, few studies have attempted to develop a measurement for the adoption and use of EMA. The first attempt to set a comprehensive measure for EMA usage, came from Ferreira *et al.* (2010). This measure consisted of twelve items reflecting main activities of EMA, which were selected and derived from various resources, (IFAC, 2005; UNDSO, 2001). These items focused on both of monetary and physical aspects of EMA, as suggested by Burritt *et al.* (2002). The items are summarized in Table 3.1.

Table 3.1  
*Items of EMA*

No	Items
1	Identification of environment-related costs
2	Estimation of environment-related contingent liabilities
3	Classification of environment-related costs
4	Allocation of environment-related costs to production processes
5	Allocation of environment-related costs to products
6	Introduction or improvement to environment-related cost management
7	Creation and use of environment-related cost accounts
8	Development and use of environment-related key performance indicators (KPIs)
9	Product life cycle cost assessments
10	Product inventory analyses
11	Product impact analyses
12	Product improvement analysis

Source: Ferreira *et al.* (2010)

A total 12 items, have been classified by Ferreira *et al.* (2010), and used as an instrument to measure use of EMA practices in the past .This instrument was also adopted by Christ and Burritt (2013) to measure the actual use of EMA practices at the time of the study and in the future. This study adapted the twelve items drawn up by Ferreira *et al.* (2010) for measuring the intention to adopt EMA practices within organizations. The original instrument as developed by Ferreira *et al.* (2010) was designed to ask about the actual use of EMA in firms over the past three years. As this study was interested in the intention to adopt EMA, it altered the wording of the original instrument to reflect this situation. The respondents were asked to assess the extent of intention to adopt each of the 12 activities of EMA in their firms. The anchors on the Likert scale were changed to reflect the different perspective of the question being asked as follows: 1 = not intent at all to 5 = intent to great extent.

### 3.3.2 Organizational Factors

As discussed in Chapter Two, many studies in previous IT/EMA literature (e.g. Ambe, 2007; Chang, 2007; Chau & Tam, 1997; Tornatzky & Fleischer, 1990) have

considered the importance of organizational factors in enhancing firms' intentions to adopt EMA. Based on the literature review, four main variables in the organizational context were selected and assumed to be the most suited for analyzing the adoption process of EMA in oil and manufacturing sectors in Libya. These variables are business strategy, nature of formalization, and organizational culture and top management support.

### **3.3.2.1 Business Strategy**

The empirical studies as shown in Chapter Two found that business strategy is as an important variable regarding the adoption and diffusion of accounting innovations. It has been argued that innovation is a significant impact, through strategy type. Firms might facilitate or impede their tendency to innovate (Gosselin, 1997; Gurd *et al.*, 2002; Tabak & Barr, 1999). Miles and Snow (1978) classified organizational strategy into four categories: prospector, analyzer, defender, and reactor types. This typology has often been adopted by a number of accounting researchers.

A prospector strategy seeks new products and service developments for meeting consumer needs, and it attempts to be the first in the market. It is also characterized by dynamic, stresses creativity, and flexibility in responding to market changes, investing heavily in research and development, and is often entrepreneurial to offer new products or services even in uncertain conditions in the market. In contrast, a defender strategy focuses on efficiency, and operates within a stable product domain, to maintain market share by focusing on assurance quality and effective cost for existing products, rather than emphasizing diversity and innovation. An analyzer strategy combines both prospector and the defender strategies through maintaining a

stable of existing products, and moving thoughtfully to new markets. Lastly, a reactor strategy usually operates when facing pressures from the external environment, and hence, it is difficult to determine its activities clearly, and lacks a consistent strategy.

Other business strategies have also been investigated by several accounting researchers. Porter (1980) categorizes business strategy into three typologies: differentiation, cost leadership and focus. A differentiation strategy is flexible to respond rapidly to opportunities in the market and emphasizes the innovative aspects of organizational activities, by meeting the wishes of the customers. A cost leadership strategy concentrates on achieving and keeping a low cost position, producing high volume and homogenous products. A focus strategy focuses on a certain group of customers, specific markets, or product segment, and therefore, it combines the elements of differentiation and cost leadership. Miller and Friesen (1982) also developed other typologies of business strategy that specify the organizations as entrepreneurial, or conservative. The organizations that follow an entrepreneurial strategy forcefully pursue innovations while firms that follow a conservative strategy reluctantly share in innovation (Ferreira *et al.*, 2008).

The typology of Miles and Snow (1978) is widely used in accounting research and is consistent with the characteristics of other strategy typologies. Furthermore, this typology has been shown as an appropriate means to classify strategies in many industries.(Shortell & Zajac, 1990). This typology has also been used recently in EMA studies (Ferreira *et al.*, 2008). Thus, Miles and Snow's typology was selected to examine the potential influence of the strategy applied by firms on the decision or intention of the organizations to adopt EMA in Libya's oil and manufacturing sectors.

A total of sixteen items obtained from Ismail (2004) were used to measure this variable. The 16 items represent two types - prospector and defender strategies. They were selected and assumed to be the most suited for analyzing the adoption process of EMA, as they consider the opposite sides of various strategies.

### **3.3.2.2 Nature of Formalization**

The nature of formalization is considered one of the most fundamental characteristics of organizational structure that has significant influence on the acceptance, adoption and use of technology and information systems. Several studies highlighted the importance of the nature of formalization such as Damanpour (1991) who found that the capability of organizations to adopt and implement innovations and systems was significantly linked to the nature and characteristics of organizational structures.

More recently, Nahm *et al.* (2003) chose the nature of formalization dimension as one important surrogate for organizational structure in the manufacturing context. According to Damanpour (1991), formalization of the organizational structure was measured by the degree of standardization of the functions by the rules that are followed into a firm versus the degree of freedom given to the organization staff in their jobs. Nahm *et al.* (2003) define the nature of formalization as the degree provided to workers with procedures and rules which divest versus promote creative, learning and autonomous labor. These authors state that formalization may restrict or support decentralization, flexibility, and autonomous labor. Thus, formalization becomes an instrument to help directors in dealing with certain issues and problems rather than a frontier that stipulates solutions.

Indeed Nahm *et al.* (2003) focus on the nature of formalization rather than the level of formalization as proposed by Burns and Stalker (1961), which comprises five items: the firm has written rules and procedures that help works to make suggestions, to make changes on their jobs, to experiment with their jobs, guide quality improvement efforts, and guide creative problem solving. The present study uses the same instrument that was developed and tested by Nahm *et al.* (2003), with an additional item related to written rules and procedures that guide performance improvement efforts, to improve the research instrument. In line with the results of prior studies, it is considered appropriate to use the nature of formalization as a surrogate for organizational structure.

### **3.3.2.3 Organizational Culture**

Organizational culture represents the common meanings that include the beliefs, values, assumptions, behaviours and attitudes of the organizational members (Kopelman *et al.*, 1990). It shapes the objectives, vision and working environment in an organization that distinguishes it from others (Hofstede, 1984). Available literature shows that organizational culture is a facilitator of innovations because of its role in inhibiting or allowing the success of such innovations (Bluedorn & Lundgren, 1993; Cameron & Quinn, 1999; Chin-Loy & Mujtaba, 2007; Trivellas & Dargenidou, 2009; Twati & Gammack, 2006). A review of the literature shows that the Competing Values Framework (CVF) has been used by many researchers (e.g. Chin-Loy & Mujtaba, 2007; Quinn, 1988; Quinn & Rohrbaugh, 1983; Shokshok *et al.*, 2010; Trivellas & Dargenidou, 2009; Twati & Gammack, 2006) as an important tool for the organizational culture construct, and measurement.

The CVF is extensively accepted amongst a growing number of researchers not only as a model of culture, but it has also been used as a measurement tool for other issues such as organizational effectiveness (Cameron & Quinn, 1999; Howard, 1993; Kwan & Walker, 1993). Thus, CVF harmonizes with the general purpose from innovation adoption that mainly aims to enhance effectiveness, or the performance of an organization (Damanpour & Gopalakrishnan, 1998). CVF has also been used as a device for drawing up the cultural profile of organizations, and performing comparative analysis (Trivellas & Dargenidou, 2009).

This framework can also be used to determine if a firm tends to focus on internal conditions, or on external conditions, and if a firm seeks flexibility and discretion or stability and control. In addition, CVF distinguishes between two dimensions for organizational culture measurement, which is divided into four parts as shown in Figure 3.2. The horizontal axis reflects the integration or internal focus versus differentiation or external focus, while the vertical axis reflects stability and control versus flexibility and discretion. Consequently, as shown in Figure 3.2, CVF has four quadrants representing four types of organizational culture which are clan, adhocracy, market, hierarchy.

The clan culture emphasizes internal focus and flexibility, employees in an organization are driven through common values, participation, loyalty, cohesiveness and teamwork and individual involvement. This type of culture enhances morale, openness and trust, while reducing the resistance to change (Cameron & Quinn, 1999). Acceptance and adoption of EMA is likely to be easier in clan culture due to

its focuses on values that enhance communication between individuals and support adoption innovation and new ideas.

The adhocracy culture is characterized by external orientation and adaptability with high flexibility. Adhocracy focuses on proactive, creative, innovative, entrepreneurial aspects to discover new markets and seize opportunities. This type of culture encourages readiness for changes (Cameron & Quinn, 1999). EMA adoption is likely to be successful in the adhocracy culture because the management in this culture supports innovation and adopt new techniques.

The market culture stresses productivity, efficiency, profitability and competitiveness which are considered core values; and it focuses on stability and control, and it is inclined more to external issues rather than internal issues. Market culture seeks to identify threats and opportunities as it values competitive advantage and profits (Cameron & Quinn, 1999). The adoption of EMA in market culture is likely to be more acceptable because EMA aims to reduce environmental impacts and determine the opportunities that improve competitive advantage and increase profits.

The hierarchy culture concentrates on the internal orientation and stability and control (Trivellas & Dargenidou, 2009). This type of culture has formalized structures that depend on the rules and procedures and responsibilities defined. Dependability, reliability, measurement, standardization, employment security, and centralization of the decision-making are predominant key values in this culture. An organization adopting this type of organizational culture considers it as a very formalized and structured place to work, where procedures rule what employees do. The large



number of employees and many levels of the organizational structure are characteristic of hierarchy culture (Cameron & Quinn, 1999).

Adoption of EMA is likely to be difficult because the introduction of changes or new systems under the hierarchy culture frequently faces uncertainty and resistance and the ‘refusal to accept changes’ mentality (Twati, 2007). Given the extensive acceptance of CVF amongst a growing number of researchers as a model and measurement tool of organizational culture, the CVF was chosen to examine the potential influence of organizational culture type on the decision or intention of Libyan organizations in the oil and manufacturing sectors to adopt EMA.

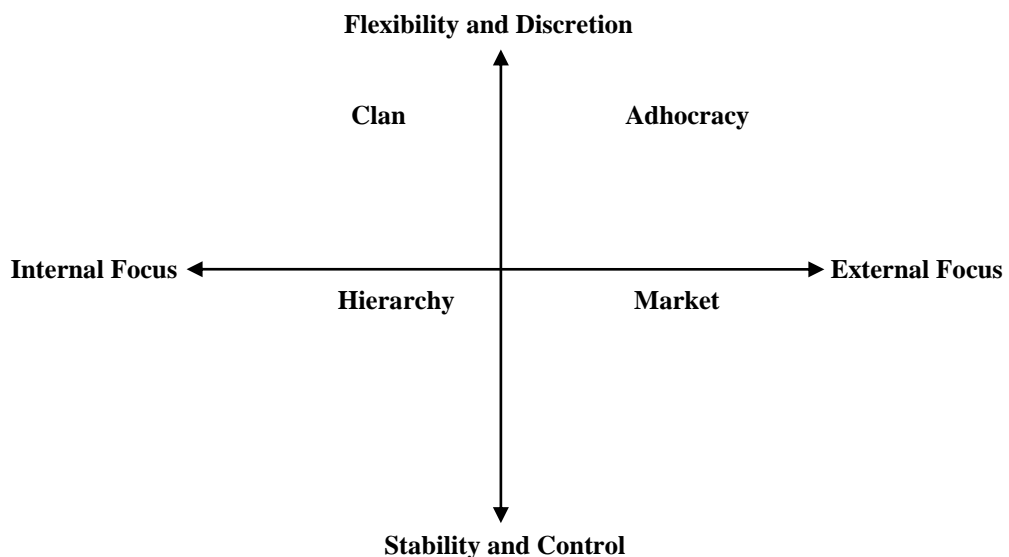


Figure 3.2  
*CVF of Organization Culture*  
Source: Cameron and Quinn (1999)

In this study, 24 items obtained from Cameron and Quinn (1999) were used to measure four dimensions of organizational culture (clan, adhocracy, market & hierarchy), which has six items for each dimension.

### 3.3.2.4 Top Management Support

As mentioned in Chapter Two, many researchers have highlighted the importance of the top management support in adopting innovation and information systems (e.g. Bradley & Fund, 2004; Daily & Huang, 2001; Dewar & Dutton, 1986; Hambrick & Mason, 1984; Henriques & Sadorsky, 1999; Wee & Quazi, 2005; Wong, 2005; Young *et al.*, 2001; Zutshi & Sohal, 2004). The top management support has also been found to be an essential factor in facilitating or inhibiting the adoption process of EMA, as indicated by several researchers such as Kokubu (2002), Kumpulainen and Pohjola (2006) and Chang and Deegan (2010). Hence, it is necessary to take into account top management's support in this research as an important factor for the adoption of EMA.

Baird *et al.* (2007) measured top management support by using four items including the authority, communication, provision of adequate resources and commitment as the components of this factor. Furthermore, Beatty, Shim, and Jones (2001) measured the top management support factor by using three items including the degree of interest, degree of importance and effective communication.

Given the importance of these components related to top management support, a total of six items drawn from Baird *et al.* (2007) and Shim, and Jones (2001) were used to assess top management support in this study and adjusted to reflect the present position concerning EMA adoption. Based on the above, six items in this study were exercise authority, communication, provision of adequate resources, commitment, interest, and recognition of the importance regarding EMA adoption.

### **3.3.3 Environmental Factors**

As mentioned earlier in Chapter Two, several studies in IT literature (e.g. Alatawi *et al.*, 2012; Gibbs & Kraemer, 2004; Soares-Aguiar & Palma-dos-Reis, 2008) and in the EMA literature (e.g. Ambe, 2007; Bennett *et al.*, 2002; Bouma & Van der Veen, 2002; Chang, 2007; Chang & Deegan, 2010) have shown the important role of the environmental factors in enhancing firms' intentions to adopt EMA practices. Based on literature related to IT, and EMA, four main variables in the environmental context were selected and assumed to be the most suitable for analyzing the adoption of EMA in the oil and manufacturing sectors in Libya. These variables are coercive pressures, normative pressures, legitimacy considerations and stakeholder pressures.

#### **3.3.3.1 Coercive Pressures**

Based on the discussion in Chapter Two, coercive or government pressures appear to be an important variable in institutional and adoptions research (e.g. Abrahamson, 1991; Delmas, 2002; Delmas & Toffel, 2004b; Delmas & Toffel, 2008; DiMaggio & Powell, 1983; Hoffman, 2001; Lapsley & Wright, 2004; Sutton *et al.*, 1994). In addition, several studies (e.g. Bartolomeo *et al.*, 2000; Bennett & James, 1998b; Burritt & Saka, 2006; IFAC, 2004; UNDSO, 2000) highlighted the importance of coercive pressures in encouraging organizations to adopt and use EMA. From this point, the current study focused on the impact of coercive pressures on firms' intentions to adopt EMA.

For the purpose of this study, the measurement instrument of the coercive pressures consisted of nine items, reflecting coercive pressures. The selection of coercive pressures items was derived from various sources (DiMaggio & Powell, 1983;

Kokubu, 2002; Lapsley & Wright, 2004; Lin, 2001). Some of the items focused on the pressures exerted by the government, while others on the pressures of legislation, as suggested by DiMaggio and Powell (1983).

The final nine items were used to operationalize the coercive pressures: government-provided effective initiatives, the needed guidelines to adopt and implement EMA, guidelines to encourage the firm to track and allocate environmental costs, educating and training programs related EMA, financial incentives, subsidies and needed facilities for EMA, requirement for firms to provide information on environmental activities, monitoring of firm's commitment to environmental legislation, imposition of strict penalties, fines for violation of environmental legislation and environmental legislation and laws mandating the adoption of certain techniques and practices for the environment protection. This study used a total nine items to assess the influence of coercive pressures applied by government agencies and legislation on the organizations' intentions to adopt EMA in the oil and manufacturing sectors in Libya.

### **3.3.3.2 Normative Pressures**

The normative pressures of professional associations and formal education are also one of the important institutional factors in the literature (e.g. Carmona & Macias, 2001; Chang, 2007; DiMaggio & Powell, 1983; IFAC, 2005; Li, 2004). There are several arguments that emphasize the role of professional associations and formal education in the creation of normative pressure to adopt EMA practices, as provided by several advocators of EMA (e.g. Bennett *et al.*, 2006; Chang, 2007; Li, 2004; UNDSO, 2001). For the purpose of this study, the measurement instrument of normative pressures consisted of seven components, reflecting normative pressures.

The selection of normative pressure component was derived from various sources (Bennett *et al.*, 2006; Delmas, 2002; DiMaggio & Powell, 1983; Li, 2004). Some of the items focused on the pressures exerted by professional bodies, while others on the pressures of formal education, as suggested by DiMaggio and Powell (1983).

The items were: professional bodies motivate the firm to adopt EMA, provide guideline principles, and needed information that help the firms to adopt EMA, effectively monitor the firm's commitment to the principles and professional standards, and provide forceful support for the training and education requirements related to EMA adoption; and formal education institutions provide adequate knowledge, effectively contribute to providing appropriate training courses related to EMA and effectively communicate to solve environmental problems. This study used a total of seven items to assess the influence of normative pressures exerted by professional bodies and formal education on organizations' intentions to adopt EMA in the oil and manufacturing sectors in Libya.

### **3.3.3.3 Legitimacy Considerations**

A literature review of environmental management shows that the decisions of organization for adopting environmental practices and strategies are impacted by the need to maintain or enhance its relationship and legitimacy with the society (Delmas & Toffel, 2004b; Delmas & Toffel, 2008; Florida & Davison, 2001; Hoffman, 2001; Prakash, 2001; Summers, 2002). According to Suchman (1995) legitimacy refers to a firm's desire to improve the appropriateness of its actions among an established set of rules, norms, values, and beliefs. Thus, it seems that legitimacy considerations are

deemed an instrument to justify internal management operations and the practices of an organisation.

Further, Suchman (1995) state that many reasons might compel organizations to look for legitimacy either as an alignment with prominent regulations, norms and laws or as an organizational resource. Céspedes-Lorente *et al.* (2003) argue that organizations obtain legitimacy by succumbing to the pressures of the community. They state that legitimacy includes social and economic aspects. For example, firms undertake activities of environment protection to maintain a high level of social esteem which is reflected positively on financial performance. On this basis, legitimacy considerations can be defined as the degree to which the various practices and activities adopted by firms enable them to achieve social prestige and acceptance, and enhance its economic performance, as described by Suchman (1995). The present study measured legitimacy considerations by considering five items, reflecting both social and economic aspects of legitimacy, as suggested by Céspedes-Lorente *et al.* (2003).

The final five items were used to measure the legitimacy considerations: the firm works in the environmentally responsible method to gain support, avoid penalties and gain legitimacy from society, the firm provides information on environmental performance to justify its internal activities and enhance its relations with stakeholders groups in the society, the firm follows public policies and rules, in order to improve its image and maintain its reputation in the society, the firm reduces environmental impacts in order to avoid fines and penalties, lessen risks and satisfy employees, the firm adopts and applies the organizational techniques and accounting

practices in order to obtain the license to operate, ensure survival and long-term sustainability. The legitimacy considerations components were derived from various sources (Bansal & Roth, 2000; Céspedes-Lorente *et al.*, 2003; Chang, 2007). This study used a total five items to assess the influence of legitimacy considerations on firms' intentions to adopt EMA in the oil and manufacturing sectors in Libya.

#### **3.3.3.4 Stakeholders Pressures**

As discussed in Chapter Two, stakeholder pressures also appear to be among the dominant variables in environmental management studies (e.g. Azzone *et al.*, 1997; Bansal & Roth, 2000; Delmas & Toffel, 2004b; Henriques & Sadosky, 1999). A reviews of the literature shows some categorization of stakeholders regarding environmental issues –namely suppliers, shareholders, government, employees, competitors, customers as well as other interest groups concerned about environmental issues (Céspedes-Lorente *et al.*, 2003; Delmas & Toffel, 2004b; Henriques & Sadosky, 1996). For the purpose of this study, the measurement instrument of stakeholder pressures consisted of five items, reflecting the extent to which each stakeholder was interested in environmental protection, and the extent to which managers perceived that stakeholders could impact procedures and policies of a firm, as suggested by Céspedes-Lorente *et al.* (2003). The five items were obtained from various sources (Céspedes-Lorente *et al.*, 2003; Chang, 2007; Darnall *et al.*, 2009; Delmas, 2009; Delmas & Toffel, 2004b).

The final five items used to operationalize stakeholder pressures included: stakeholders threaten the firm with sanctions if it does not reduce the environmental impacts, promise rewards to the firm if improves its environmental behavior, remind

the firm of its moral obligation toward the environment protection, promote the adoption of certain techniques and practices to reduce the environmental impacts and improve the environmental performance, and requirement from the firm to provide information regarding environmental activities. This study used a total five items to assess the influence of stakeholder pressures on firms' intentions to adopt EMA.

### **3.3.4 Technological Factors**

As mentioned earlier in Chapter Two, several studies in literature related to IT adoption (e.g. Alatawi *et al.*, 2012; Grover, 1993; Twati, 2007) found that factors in the technological context that normally explain attributes of innovation influence the adoption of organizational practices and innovation. Hence, this study considered two characteristics of innovation in the EMA context - the perceived benefits and the perceived importance. They were selected and assumed to be the most suitable for analyzing the adoption process of EMA in the oil and manufacturing sectors in Libya.

#### **3.3.4.1 Perceived Benefits of EMA**

In the literature, many studies considered the perceived benefits as important in the acceptance, adoption and use of technologies and organizational practices (e.g. Beatty *et al.*, 2001; Chau & Tam, 2000; Iacovou *et al.*, 1995; Kuan & Chau, 2001; Oliveira & Martins, 2008; Twati, 2007). According to Chau and Tam (1997), perceived benefits are mainly concerned with benefits that capture the extent of agreement with claimed benefits. In the EMA context, the first published work that explored the EMA benefits was done by Ferreira *et al.* (2010). These researchers classified the benefits of IT into the following 15 items:



- Increased demand for green products
- Increase in product margins
- Increase in customer satisfaction
- Cost of capital reduction
- Insurance cost reduction
- Operating cost reduction
- Identification of new opportunities
- Generation of process innovation
- Generation of product innovation.
- Attraction of better quality staff
- Improvement in productivity
- Improvement in reputation
- Improvement in decision-making
- Product costing improvement
- Production process improvement

These 15 items relating to EMA benefits were drawn from the professional and academic literature. Ferreira *et al.* (2010) developed this instrument to measure the level of benefits from EMA use. This study adapted this instrument to reflect the benefits of EMA adoption, as perceived by managers in firms. The instrument contained a total of 15 items to measure the perceived benefits related EMA adoption.

#### **3.3.4.2 Perceived Importance of EMA**

As mentioned earlier in Chapter Two, the literature considered the perceived importance as one of important factors in the technological context that impact the acceptance, adoption and use IT (Chai *et al.*, 2006; ChanLin, 2007; Chau & Tam, 1997; Janvrin *et al.*, 2008; Leonard *et al.*, 2004; Oliveira & Martins, 2011). According to Cohen (1990) perceived importance can be defined as the degree to which people perceive that technique is necessary and important to enhance their performance.

The importance of EMA at the organizational level, as perceived by managers in firms, was also measured using the instrument of Ferreira *et al.* (2010) adapted to measure the perceived importance of EMA. The respondents were asked to assess the

extent of importance each of the 12 activities of EMA in their firm. The anchors on the Likert scale were changed to reflect the different perspective of the question being asked as follows: 1 = not important at all to 5 = very important.

The original instrument as developed by Ferreira *et al.* (2010) asked about the use of EMA in firms over the past three years. As this study was interested in the perceived importance of EMA, thus, it altered the wording of the original instrument to reflect this situation. This approach was used in the study of Christ and Burritt (2013) which adjusted research instrument developed by Ferreira *et al.* (2010) to measure both of the present roles of EMA and future role of EMA at organizational level.

Based on the above discussion, the overall conceptual research model for the study, depicted in Figure 3.1 (p. 129), was modified to incorporate all specified dimensions and variables. Figure 3.3 illustrates the enhanced research model that includes all direct and indirect relationships between organizational, environmental, technological factors and intention to adopt EMA. As can be seen in Figure 3.3, the researcher examined the direct and indirect relationships of organizational variables that included business strategy types [Prospector Strategy (PS) and Defender Strategy] (DS), Nature of Formalization (NF), organizational culture types [Clan Culture (CC), Adhocracy Culture (AC), Market Culture (MC) and Hierarchy Culture (HC)], and Top Management Support (TMS), and technological variables [Perceived Benefits of EMA (PBEMA) and Perceived Importance of EMA (PIEMA)] on the Intention to Adopt EMA (ITAEMA). Technological variables were conceptualized as having a mediating role on the intention to adopt EMA in oil and manufacturing industry sectors in Libya.

In addition, Figure 3.3 shows possible direct and indirect relationships of environmental variables that include Coercive Pressures (CP), Normative Pressures (NP), Legitimacy Consideration (LC) and Stakeholder Pressures (SP). Similar to the steps outlined in relation to organizational variables, the model proposes the direct and indirect relationships between environmental variables, technological variables and intention to adopt EMA. The literature points to several studies that have examined each of the organizational and environmental variable groups separately and in combination with technological variables as a basis to predict the IS/IT adoption (e.g. Alatawi *et al.*, 2012; Twati, 2007).

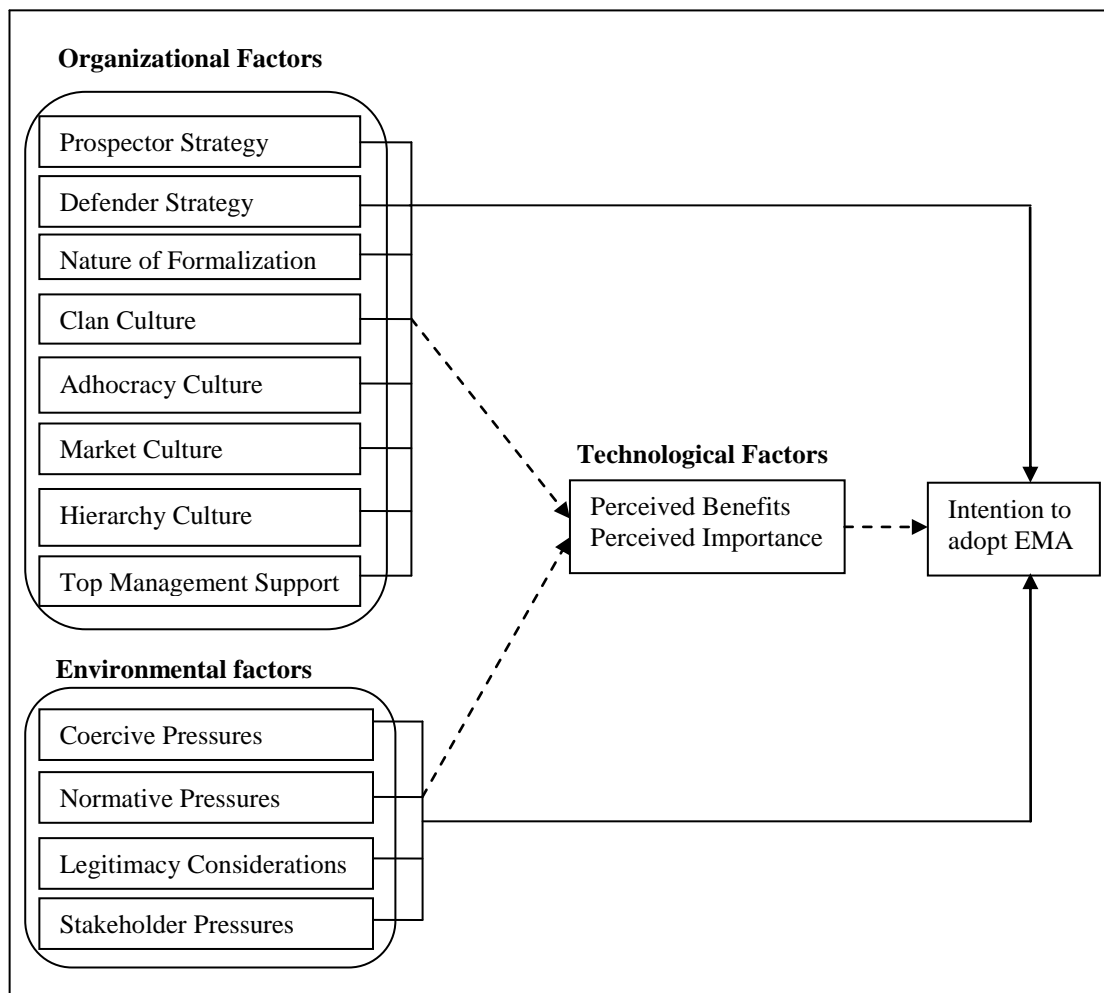


Figure 3.3  
*The Enhanced Research Model of this Study*

### **3.4 Research Hypotheses**

Chapter Two reviewed literature on EMA, IT, environmental and organizational practices adoption. This section presents the development of the research hypotheses of the study based on the discussion in the literature. The hypotheses were aimed at determining the relationships between different variables, the focus of the present study as shown below.

#### **3.4.1 Business Strategy and Intention to Adopt EMA**

According to Ferreira *et al.* (2010), business strategy type can play an important role in the adoption and implementation and use of EMA in organizations, through two perspectives. The first perspective is that EMA is a part of the management control system, which ensures effectively and efficient use of resources by managers in order to achieve the organizations' goals; hence, the management control systems seek to achieve better performance for the organizations (Ferreira *et al.*, 2008, 2010).

The literature shows that business strategy is a main factor in the formation of management control systems, due to its central role in identifying the means needed to achieve the organization's objectives (Otley, 1999; Simons, 1987). EMA as a tool stresses the effective and efficient use of resources and contributes to the improvement of organizations' performance; thus, it implies that EMA constitutes a part of management control system. As a result, if the business strategy type is an important determinant for the management control systems, it is expected to have an influence on EMA adoption and implementation (Ferreira *et al.*, 2008).

The second view, EMA, as suggested by Ferreira *et al.* (2010) represents one of fresh developments in management accounting, and it is still at the early stages in terms of its adoption and implementation, and represents the relatively recent phenomenon within the literature. This supports the perspective that sees EMA as a new innovation in management accounting. Rikhardsson *et al.* (2005) also state that EMA is relatively a new field in both academic research and practice, as this term was used for the first time only in the 1990s.

As mentioned before in Chapter One, Jasch (2003) states that EMA is a new technique aimed at adding developments and improvements in management accounting and providing sufficient information to the management for sound decision-making related to different activities in the organization. Furthermore, Miles and Snow (1978) suggest that the strategy type applied by organizations will have an effect on the adoption and implementation of new organizational innovations, practices and new ideas. They argue that the adoption of the innovations and changes in the prospector organizations will be easier than the defender organizations, because they will have the tendency to adopt innovations, as well as structures which facilitate many modifications.

This is confirmed by Gosselin (1997) who found that the strategy type followed by corporations was an important factor in the adoption of activity management, and observed that firms with a prospector strategy type tended to adopt innovations in accounting than the firms dominated by defender strategy type. Therefore, it is expected that organizations pursuing a prospector strategy are more likely or willing to adopt EMA than those organizations pursuing a defender strategy. This discussion

leads to the following hypothesis that represents the relationship between business strategy type and EMA.

**H1:** Business strategy type will have a positive significant direct influence on intention to adopt EMA practices.

This hypothesis will be expanded into sub hypotheses to be tested regarding the two types of strategy (prospector and defender) as shown below.

**H1.1:** Firms dominated by prospector strategy will have a positive significant direct influence on intention to adopt EMA practices.

**H1.2:** Firms dominated by defender strategy will have a negative significant direct influence on intention to adopt EMA practices.

Moreover, the benefits and importance of technology, information systems are perceived differently in different firms in many countries (McCoy, Everard & Jones, 2005; Twati, 2007). Consequently, it is proposed that perceived benefits and perceived importance of EMA would play a mediating role on the intention to adopt EMA with business strategy type in firms. Therefore, the following is formulated:

**H1a:** The influence of business strategy type on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.

This hypothesis will also be expanded into sub hypotheses to be tested regarding the two types of strategy (prospector and defender) as shown below.

**H1a.1:** The influence of prospector strategy on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.

**H1a.2:** The influence of defender strategy on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.

### **3.4.2 Nature of Formalization and Intention to Adopt EMA**

Researchers have agreed that it is important to consider organizational structure characteristics when adopting organizational practices and innovations (e.g. Aiken & Hage, 1971; Damanpour, 1987, 1991; Gosselin, 1997; Hull & Hage, 1982; Kimberly & Evanisko, 1981; Tabak & Barr, 1999).

A literature review shows that organic organizations facilitate the adoption of innovations, while mechanistic organizations are not conducive to the adoption of innovations. For example, using meta-analysis evidence, Damanpour (1991), found that that the adoption of innovations was easier in organizations with organic characteristics. Studies such as those done by Nahm *et al.* (2003), and Damanpour and Schneider (2006) indicate that the nature of formalization is one of the most important characteristics of the organizational structure that can play a vital role in encouraging the employees to adopt innovations and new practices in manufacturing firms. For

example, Nahm *et al.* (2003) conclude that organizations, which have procedures and rules that promote creativity, autonomous labor and learning, tend to have decentralization of decision-making, flexibility, and easily communication. Therefore, firms that have flexible rules and procedures encourage and support creativity, are more likely or willing to adopt EMA. Thus, the present study has formulated the following hypothesis that represents the relationship between nature of formalization and EMA adoption.

**H2:** Nature of formalization will have a positive significant direct influence on intention to adopt EMA practices.

It is also proposed that the perceived benefits and perceived importance of EMA would play a mediating role on the intention to adopt EMA with nature of formalization in firms, leading to the following hypothesis:

**H2 a:** The influence of nature of formalization on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.

### **3.4.3 Organizational Culture and Intention to Adopt EMA**

Although, organizational culture is viewed as an important factor in accepting and adopting innovations and organizational changes, it has still been neglected in EMA literature. As suggested by Chang (2007), cultural factors are likely to have an important influence on the EMA adoption process, and it is necessary to take cultural factors into account regarding this issue.



In addition, Bartolomeo *et al.* (2000) state that cultural factors maybe reflected on EMA practices, and that organizational culture would have a positive influence on the acceptance, adoption and diffusion of EMA. In addition, Bartolomeo and his colleagues argue that there is a need for more investigation to explain these issues. A review of previous literature shows that no attempt has been made to empirically investigate the influence of organizational culture on EMA adoption and implementation (e.g. Chang, 2007; Chang & Deegan, 2010; Ferreira *et al.*, 2010; Rikhardsson *et al.*, 2005). For example, Rikhardsson *et al.* (2005) and Ferreira *et al.* (2010) state that EMA is a relatively new field in both academic research and practice, as this term was first used only in the 1990s. Thus, EMA can be characterized as a management accounting innovation.

As mentioned earlier in this chapter, several researchers contend that there is a significant relationship between organizational culture and the successful adoption of technological innovations, information management systems and organizational practices (e.g. Becker, 1993; Cameron & Quinn, 1999; Chin-Loy & Mujtaba, 2007; Gurd *et al.*, 2002; Shokshok *et al.*, 2010; Tabak & Barr, 1999; Trivellas & Dargenidou, 2009; Twati, 2007; Twati & Gammack, 2006; Westbrook, 1993). For instance, Twati and Gammack (2006) provide empirical support to show that the type of organizational culture is a significant factor for adopting information systems. Twati (2007) found that adhocracy and market cultures are positively related to the adoption of management information systems applications in the Arabic Gulf region. In addition, Dellana and Hauser (1999) found that the adhocracy and clan culture types were significantly associated with total quality management success. They concluded that the organizational culture type was an important factor for the adoption of the

organizational innovations and changes. Trivellas and Dargenidou (2009) suggest that hierarchy culture poorly supports organizational adaptations as it is consistent with stable environments. Such environments do not support changes, the adoption of organizational innovations or introduction of new ideas.

Building on the increasing importance of cultural variables on organizational practice, it is expected that organizational culture type may have a significant influence on EMA adoption. Thus, the relationship between organizational culture and EMA adoption can be worded in the following hypothesis:

**H3:** Organizational culture type will have a significant positive direct influence on intention to adopt EMA practices.

This hypothesis will be expanded into sub hypotheses to be tested concerning the four types of organizational culture (clan, adhocracy, market and hierarchy) as shown below.

**H3.1:** Firms dominated by clan culture type will have a positive significant direct influence on intention to adopt EMA practices.

**H3.2:** Firms dominated by adhocracy culture type will have a positive significant direct influence on intention to adopt EMA practices.

**H3.3:** Firms dominated by market culture type will have a positive significant direct influence on intention to adopt EMA practices.

**H3.4:** Firms dominated by hierarchy culture type will have a negative significant direct influence on intention to adopt EMA practices.

It is also proposed that perceived benefits and perceived importance of EMA would play a mediating role on the intention to adopt EMA with organizational culture in firms, leading to the following hypothesis:

**H3a:** The influence of organizational culture type on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.

This hypothesis will also be expanded into sub hypotheses to be tested in regard to the four types of culture (clan, adhocracy, market and hierarchy) as below.

**H3a.1:** The influence of clan culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.

**H3a.2:** The influence of adhocracy culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.

**H3a.3:** The influence of market culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.

**H3a.4:** The influence of hierarchy culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.

#### **3.4.4 Top Management Support and Intention to Adopt EMA**

The review of many prior studies highlights the importance of top management's support in the adoption of innovations as top managers play a key role in any decision-making (e.g. Buchholtz & Ribbens, 1994; Damanpour & Schneider, 2006; Kimberly & Evanisko, 1981). However, very few studies have studied the relationship between top management support and adoption of EMA practices.

Furthermore, a number of researchers, for example, (Chang, 2007; Kokubu & Nashioka, 2006a; Wilmshurst & Frost, 2001) argue that positive attitudes, visions and directions of senior executives regarding environmental issues can provide the thrust needed to adopt and implement EMA. The support of top managers can also affect the success or failure of EMA adoption as they play an important role in decisions of organizations. In addition, the extent of top management's interest in and top management's familiarity with the importance and benefits of EMA, and its role in improving the environmental performance and achievement of the sustainability of an organization can affect the success or failure of EMA adoption. On the other hand, the support of the leadership is an essential factor to push individuals in various organizational units to cooperate in managing many activities, which in turn improves the organization's performance. Building on the above discussion, it is clear that top management's support is important, in the adoption of organizational practices within organizations. Therefore, it is expected that the top management's support will be a

vital factor in enhancing the intention of organizations to accept and adopt EMA practices. Thus, the relationship between top management's support and intention to adopt EMA is worded in following hypothesis.

**H4:** Greater top management's support will have a significant positive direct influence on intention to adopt EMA practices.

It is also proposed that perceived benefits and perceived importance of EMA would play a mediating role on the intention to adopt EMA with top management's support in firms, leading to the following hypothesis:

**H4a:** The influence of top management's support on intention to adopt EMA practices will be positive and significant but mediated by perceived benefits, and perceived importance.

### **3.4.5 Coercive Pressures and Intention to Adopt EMA**

The importance of pressures exerted by governments and affiliate agencies in regard to the EMA adoption process within organizations has been highlighted by a number of EMA researchers (e.g. Ambe, 2007; Burritt & Saka, 2006; Chang, 2007; Kokubu, 2002; Kokubu & Nashioka, 2006b; Li, 2004; Mia, 2005; Scavone, 2006a). For example, Ambe (2007) argues that government pressure is one of important factors which may affect the organizations' decision to adopt and implement EMA. Mia (2005) also sees that the government's role is essential to encourage organizations to adopt EMA, and state that congenial policies, programs, and the guidelines provided

by governments can play a vital role in nudging, encouraging and motivating the organizations in this direction.

This is supported by Kokubu (2002), who explained that the guidelines developed by the Japanese government and affiliate agencies regarding EMA played an important role in encouraging many firms to introduce EMA to their management systems. Kokubu and Nashioka (2006b) also found that governmental guidelines and policies have a strong effect on EMA practices within organizations in different industries such as gas, iron and steel, cement, glass, chemicals, food. On the other hand, several studies found that the increase of environmental legislation pushed many firms to adopt environmental practices in many countries, particularly in developed countries (e.g. Delmas, 2002; Delmas & Toffel, 2004a; Delmas & Toffel, 2004b; Gadenne & Zaman, 2002; IFAC, 2004; Rugman & Verbeke, 1998; Welford & Gouldson, 1993).

For example, Welford and Gouldson (1993) argue that environmental legislation development is one of the most important factors that influenced industry behavior in the adoption of environment practices. Moreover, it is argued that, there is evidence to show that organizations adopted green activities and actions in order to comply with rules and norms in the society (Boons & Strannegård, 2000; Qian, W & Burritt, 2009). Thus, organizations will be more likely to adopt the strategies of environmental management when they face strong coercive pressures (Qian, W & Burritt, 2009). According to Chang (2007), without governmental pressures, regulations, and laws that bind organizations with accounting procedures and practices related to environmental activities, organizations will be less likely to adopt EMA. This view is supported by Gadenne and Zaman (2002), who found that legal

compliance was the main motivation for many corporations to incorporate environmental costs measurement. Furthermore, Lapsley and Wright (2004) found that the adoption process of management accounting innovations was greatly influenced by government pressures, in particular, in public sector organizations, because employees in these organizations were more willing to respond to governmental guidelines and policies.

Building on the earlier discussion, it is also expected that coercive pressures exerted by government agencies, and legislation may have a significant influence on the EMA adoption process within organizations. Thus, greater pressures exerted by government agencies and legislation on organizations will play an important role in enhancing the intention of organizations to accept and adopt EMA practices. Therefore, the relationship between coercive pressures and the intention to adopt EMA practices is worded in the following hypothesis.

**H5:** Greater coercive pressures will have a significant positive direct influence on intention to adopt EMA practices.

It is also proposed that perceived benefits and perceived importance of EMA would play a mediating role on the relationship between coercive pressures and intention to adopt EMA in firms, leading to the following hypothesis:

**H5a:** The influence of coercive pressures on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.

### **3.4.6 Normative Pressures and Intention to Adopt EMA**

The previous studies draw attention to the important role of the normative pressures exerted by professional bodies and formal education in the adoption of organizational practices and information technologies within many organizations (e.g. Ahmad & Gao, 2004; Chang, 2007; Chang & Deegan, 2010; Enthoven, 1983; IFAC, 2005; Khalifa & Davison, 2006; Radebaugh, 1975; Silva & Figueroa, 2002; UNDSO, 2001). However, the influence of these pressures on organizations may differ from country to country. According to Chang and Deegan (2010), professional associations and formal education have played an important role in influencing organizations' behavior towards environmental issues and adoption of EMA, more so in developed countries than in developing countries. Therefore, it is expected that intention or willingness of firms to adopt EMA will be influenced by the level of pressures exerted by professional bodies or formal education. The following hypothesis represents the relationship between normative pressures and intention to adopt EMA practices.

**H6:** Greater normative pressures will have a significant positive direct influence on intention to adopt EMA practices.

It is also proposed that perceived benefits and perceived importance of EMA would play a mediating role on the relationship between normative pressures and intention to adopt EMA in firms, leading to the following hypothesis:

**H6a:** The influence of normative pressures on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.



### **3.4.7 Legitimacy Considerations and Intention to Adopt EMA**

The importance of legitimacy considerations caused by community pressures in respect to the adoption of organizational practices has been explained by many researchers (e.g. Delmas & Toffel, 2004b; Delmas & Toffel, 2008; Florida & Davison, 2001; Hoffman, 2001; Prakash, 2001; Summers, 2002). However, this importance may differ from community to community. For example, Delmas and Toffel (2004b) suggest that some communities might be better at encouraging organizations to adopt environmental practices than other communities.

This may depend on the level of income, and education, and population, as well as socioeconomic characteristics (Delmas & Toffel, 2004b). Delmas and Toffe (2004b) also state that the adoption of environmental management practices within organizations have been impacted by the desire to better or maintain their relations with communities.

In this context, Florida and Davison (2001) found that there was a positive correlation between the adoption of several environmental practices and programmes such as pollution prevention programmes and legitimacy considerations, and they suggest that organizations which have active engagement with communities are more willing to adopt of the environmental practices than those are not. Furthermore, Henriques and Sadorsky (1996) provide empirical evidence to show that pressure groups in the community played an important role in the adoption of environmental plans and practices within firms.

Building on the above discussion, it is clear that legitimacy considerations are important in influencing the decision of many organizations to adopt many environmental practices. Therefore, it is expected that legitimacy considerations emanating from community pressures are more likely to have a strong influence on intention and willing to EMA adoption within organizations. Thus, the relationship between legitimacy considerations and intention to adopt EMA is expressed in following hypothesis:

**H7:** Legitimacy considerations will have a positive significant direct influence on intention to adopt EMA practices.

It is also proposed that perceived benefits and perceived importance of EMA would play a mediating role on the relationship between legitimacy considerations and intention to adopt EMA in firms, leading to the following hypothesis:

**H7a:** The influence of legitimacy considerations on intention to adopt EMA practices will be positive and significant, but mediated by the perceived benefits, and perceived importance.

#### **3.4.8 Stakeholders Pressures and Intention to Adopt EMA**

The importance of stakeholders' pressures in the adoption of environmental initiatives and environmental management practices has been explained by many previous studies (e.g. Bansal & Roth, 2000; Christmann & Taylor, 2001; Delmas & Toffel, 2004b; Henriques & Sadosky, 1996; Kollman & Prakash, 2002). These studies have also offered empirical evidence to show that a positive relationship exists between the

pressures of stakeholders groups and environmental management practices adoption. For example, Bansal and Roth (2000), suggest that the stakeholders groups have been instrumental in ensuring organizations take appropriate environmental measures.

In the EMA context, the pressures exerted by various stakeholders groups can play an important role in influencing organizations' decisions to adopt EMA. It is argued that in the absence of stakeholders' pressures, organizations would not worry about environmental and sustainability issues, and thus they might not be eager to adopt EMA (Viere *et al.*, 2006b).

Therefore, it is expected that the willingness of organizations to adopt EMA will be greater with the existence of pressure from different stakeholders. The following hypothesis represents the relationship between stakeholder pressures and intention to adopt EMA.

**H8:** Greater stakeholder pressures will have a significant positive direct influence on intention to adopt EMA practices.

It is also proposed that perceived benefits and perceived importance of EMA would play a mediating role on the relationship between stakeholder pressures and intention to adopt EMA in firms, leading to the following hypothesis:

**H8a:** The influence of stakeholder pressures on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.

### **3.5 Research Methodology**

Research methodology addresses the design of the research to test the hypotheses of this study. It also discusses the sampling frame, questionnaire design, the data collection method and data analysis method.

### **3.6 Research Design**

The research design is commonly viewed as a systematic process aimed at developing the roadmap for guiding the researchers. According to Thyer (1993), a research design is an illustrative plan for completing the research, operationalizing variables, collecting data, and subsequently deriving the results by analyzing the data. Generally, the research can be classified into three main types, according to the nature and objective of the study.

#### **3.6.1 Exploratory Study**

An exploratory study is that type of research that is being performed when there is inadequate understanding of certain issues to examine new concepts or phenomena (Sekaran, 2003). This type of the research, more often, involves qualitative methods than quantitative methods (Hair, Money, Page & Samouel, 2007). Four approaches can be used to obtain information – namely, secondary data analysis, pilot study, case study and experience survey to build initial ideas about a situation (Zikmund, 2003).

#### **3.6.2 Descriptive Study**

The descriptive study is aimed at describing the key attributes that answer questions about the current situation (Sekaran, 2003). This research design can be categorized

into cross-sectional studies or longitudinal studies. As the name suggests, cross-sectional studies gather data only once, or at a certain point of time, whereas longitudinal studies collect data over time (Hair *et al.*, 2007). In descriptive research, data can be collected by means of observations, interviews, or a questionnaire (Gay & Airasian, 2003). The statistical analyses utilized for descriptive studies are computing the central tendency, correlations and variances (Leedy & Ormrod, 2001).

### **3.6.3 Hypotheses Testing**

This design employs a testable scheme to investigate the relationships between the different variables (Saunders, Lewis & Thornhill, 2009). The main purpose of this design is to explain the variances on the dependent variable or to predict the results of the relationships between independent and dependent variables (Sekaran, 2003). The major purpose of this study is to examine the relationships between different variables, and the study can be considered as a descriptive and hypothesis testing study. The descriptive statistics are used to find out the key attributes of a population to provide a better understanding of the population of the study. On the other hand, the test of hypotheses is used to examine the relationships between the independent and dependent variables to determine if there are any differences between them.

### **3.7 Selection of Research Strategy**

According to Zikmund (2003), the availability of information, objectives, and costs of conducting the research are the main factors affecting the choice of research design. In addition, the design of a good research requires choosing a suitable research instrument and questions that meet the study objectives. The main objective of this

study was to examine the impact of factors that may influence the EMA adoption process within firms in the oil and manufacturing sectors in Libya. To achieve this objective, the study adopted the survey as a main instrument to obtain the data to examine the relationships among the dependent and independent variables (Davis, 1996). The advantages of this strategy are the wide coverage and low costs. A survey can cover a large geographical area, and reduce the cost and time as well as include responses from a large number of the respondents and the findings can be generalized to the population at large.

A literature review shows that several kinds of survey are used to collect data. They include content analysis, observation, interviews and questionnaires. The questionnaire represents the most widely technique used to collect the data in survey studies (Babbie & Mouton, 1998; Bourque & Fielder, 2003). The advantages of using the questionnaire method are many. The greatest advantage is the lower cost of this technique when compared with other methods. Furthermore, it is easy to administer the survey to a large number of respondents, and questionnaires can be mailed or handed directly to the participants. In addition, this method is economical for collecting data from a large number of firms in diverse sectors. Respondents can return the questionnaires anonymously, which may lead to more honest responses, which in turn, lessens the impact of researcher bias (Dawson, 2002).

Therefore, this study adopted the questionnaire method to obtain the data from firms in the oil and manufacturing sectors in Libya. Several approaches can be followed in administering a questionnaire: personally, mailing the questionnaires to respondents, or distributing the questionnaires electronically (Sekaran, 2003).

- Personally administering questionnaires is a suitable way to collect the data when the survey is limited to a local area and the organization is willing and able to assemble and guide the employees to respond to the questionnaires (Sekaran, 2003). The major advantage of this method is that the researcher can collect all completed responses within a short period of time. The major disadvantage of this method is the geographical limitations, which can consume time and cost.
  
- Mailing the questionnaires is appropriate when the sample is large and can be distributed in wide geographical areas with minimal costs. However, the main disadvantage of this method is that the response rate of questionnaires distributed by mail is usually low (Sekaran, 2003).
  
- Electronic questionnaires are suitable for use with e-mail and/or Web access. There are several advantages of this method, for example, low cost, high speed and early recognition of valid addresses. However, the response rate of this method particularly e-mailed questionnaires, is not as high as personally administered or mailed questionnaires (Schaefer & Dillman, 1998).

Based on the above discussion, the personally administered questionnaire was thought to be the most appropriate data collection method of this study, because in Libya, mailed questionnaires and electronic questionnaires are too difficult to administer. In addition, the targeted respondents of this study are located in a limited geographical area. Hence, the personally-administered questionnaire is a suitable method to collect data for this study, as suggested by Sekaran (2003).

### **3.8 Population of Study**

According to Sekaran (2003), the population refers to the “entire group of people, events, or things of interests that researcher wishes to investigate”. The population is a collection of elements which the study is interested in examining. The population of current study comprised 177 firms operating in Libya’s oil and manufacturing sectors. The selected firms were from the oil and gas, chemical, cement and building material, geometric and electric, iron and steel, food, textile, and plastic and furniture industries. These firms had been selected based on two directories. The first directory was the National Oil Corporation (NOC) 2012, the main general organization that supervised firms in the oil and gas sector in Libya, including 22 firms in different activities - exploration, production, service and marketing operations. The second directory came from the Ministry of Industry in Libya 2009, representing 155 manufacturing firms in the public and sector private, incorporating small, medium and large size firms.

Given the difference found in the literature regarding the firm size classification, the researcher contacted both the Libyan NOC and the Ministry of Industry, the Ministry of Economy and trade for consultation. They both assured the researcher that small-sized companies had less than 100 employees, medium-sized companies had between 100 and 500 employees, and large sized companies had over 500 employees, as classified by Twati (2008). The oil and manufacturing industries were selected because they represented more than 75% of the total output within Libya and played a pivotal role in the economic growth and contributed significantly to other economic sectors in Libya (CIID, 2007). Furthermore, they were considered more sensitive in environmental terms and usually relied heavily on resources extracted from nature



(Ahmad, 2004; Ferreira *et al.*, 2010; Frost & Wilmshurst, 2000a; Hottentot, 2006; Öztürk, Yetis, Dilek & Demirer, 2006), and they were expected to be most willing to adopt environmental management practices such as EMA (Bebbington *et al.*, 1994; Ferreira *et al.*, 2010).

### **3.9 The Sample Frame**

A sampling frame is a comprehensive list of elements representing the population of the study from which a sample can be taken. In this study, the target population comprised the financial directors and environmental managers who worked at 177 firms from the oil and manufacturing sectors in Libya. The managers at the two levels were considered suitable, given their participation in the daily operations, and financial activities of firms, and their probable participation in environment-related activities, managerial strategies and their vital role in the decision-making (Christ & Burritt, 2013; Ferreira *et al.*, 2010; Jalaludin *et al.*, 2011). Considering the small population size of Libyan firms in both sectors, it was decided to include all 177 firms in the sample of this study, and thus the sample size in this study comprised a total of 354 respondents at two managerial levels in each firm in the oil and manufacturing sectors. The two managerial levels was selected in order to minimize the potential bias of single respondent, to get clear picture and comprehensive responses, as indicated in past studies (Chin-Loy & Mujtaba, 2007; Ferreira *et al.*, 2010; Twati, 2007, 2008; Twati & Gammack, 2006). For example, Chin-Loy and Mujtaba' study (2007) sent the questionnaires to respondents at various organizational levels in each respective organization included the departments of administration, customer service finance, information systems, human resources and others. In the study of Twati (2008), the

data also was collected from managers of MIS department, CEOs, and other relevant senior middle and lower of management levels in each of the selected corporations.

According to Comrey and Lee (1992), the sample size is sufficient to perform statistical procedures and specific data analysis such as multivariate analysis. Sekaran (2003) also states that the appropriate sample size for most research ought to be larger than 30 and less than 500. In addition, it was expected that the response rate would range between 60% and 70% of the current study. This was in line with earlier studies conducted in Libya such as Twati and Gammack (2006), who received a response rate of 72.4% when surveying IS/IT adoption among Libyan companies, and Twati's study (2008) received a response rate of 79.3%. In studies conducted by Hokoma, Khan and Hussain (2008a, 2008b, 2010) in the Libyan oil and gas, cement, and iron and steel firms, the response rates, ranging between 45% and 60%, were achieved. Two studies conducted in Libya, one by Youssef (2006) achieved a response rate of 75%, and another by Sayeh (2006) achieved a response rate of 67%.

### **3.10 Data Collection Procedures**

The main focus of this research was to examine the influence of the organizational, the environmental and the technological variables on the EMA adoption process in general and intention to adopt EMA in particular. To achieve the objectives of this study, a questionnaire was developed to collect data from the respondents to provide answers to the research questions. A personally-administered questionnaire survey was used as strategy for this study. As stringent the regulations prohibit employees within Libyan firms to respond to any questionnaires, unless with consent of the top management, permission was formally sought from them. After permission was

obtained from these firms, the questionnaires were distributed by hand to financial directors and environmental managers.

### **3.11 Questionnaire Design**

The main purpose of the research design was to develop an effective instrument that met the objectives of the present research. The questionnaire should be friendly, concise, attractive and easy to answer in line with Gay and Diehl's guidelines (1992). Some of the questions were adopted from previous studies, due to their high reliability and validity. However, other questions were specifically developed to meet the research purposes. Several aspects (listed below) had been taken into account when wording the questionnaire items to achieve a satisfying response rate, as proposed by Hair *et al.* (2011):

1. Use common language with uncomplicated words.
2. Use direct and short questions.
3. Avoid vagueness in asking questions.
4. Avoid questions leading to desirable answers.
5. Avoid questions that include two or more concerns.

To make the questionnaire more attractive and concise, it was printed on colored paper and on both sides of the paper to reduce costs. The question format was varied, but instructions in the questionnaire were clear and consistent. For example, it asked the respondents to tick a suitable answer in each question that needed only one response, while other instructions were developed for the questions that used the Likert scale. At the end of the questionnaire, space was provided for writing any comments by each respondent.

### 3.11.1 Questionnaire Structure

The questionnaire was structured into eleven sections to meet the research purposes. The questions on general information were developed at the start of the questionnaire, and then the other questionnaires were ordered based on importance:

1. Section A comprised a series of questions to elicit information on the background of the respondent and the firm in which the respondent worked at the time of the survey, including: gender, age, educational level, function, tenure in position, type of industry, ownership of firm and the number of employees in the firm.
2. Section B was designed to elicit information on the situation of EMA adoption and it was divided into three parts: B1, B2, and B3. B1 consisted of twelve questions, designed to measure the level of perceived importance of EMA within firms. Respondents were asked to rate the importance of EMA practices within their firms. All items were measured by using a five-point Likert scale. B2 used Yes and No questions to investigate if the firm adopted EMA practices or not. B3 also consisted of twelve questions, designed to investigate the intention or willingness to adopt EMA practices within firms which had not yet adopted EMA. The items also used a five-point Likert scale.

Section B1 and B3 were similar in structure. The difference was that section B1 focused on the perceived importance of EMA while section B3 examined the intention to adopt EMA.

3. Section C consisted of fifteen questions designed to identify the level of perceived benefits of EMA adoption within firms. Respondents were asked about the perceived benefits of EMA adoption within their firms. All items were measured by using a five-point Likert scale.
4. Section D consisted of six questions, designed to elicit information on the top management support to adopt EMA. Respondents were asked the extent to which top management provided support to adopt EMA practices within their firms. All items of this variable were measured by a five-point Likert scale.
5. Section E was designed to investigate the type of business strategy adopted within firms. This section was divided into two parts. The statements in Part A represented the characteristics of prospector strategy, while in Part B represented the characteristics of defender strategy. Respondents were asked to choose items that were consistent with practices in their firms. All items were measured by using a five-point Likert scale.
6. Section F consisted of six questions, designed to examine the nature of formalization of organizational structure. Respondents were asked to indicate what items of formalization were adopted by their firms. All the items of this variable were measured by using a five-point Likert scale.
7. Section G consisted of six questions, designed to identify organizational culture type adopted by firms. Each question had four alternatives relevant to the four dimensions (types) of the clan culture, the adhocracy culture, the

market culture and the hierarchy culture. Respondents were asked the extent to which each of 24 items fit their own organization. All items of organizational culture were measured by using a five-point Likert scale.

8. Section H consisted of nine questions, designed to measure the level of coercive pressures exerted by the government and legislation on the firms regarding the adoption of EMA practices. Respondents were asked about the existence of pressures exerted by the government and legislation to adopt EMA practices within their firms. All items on the coercive pressures variable were measured by using a five-point Likert scale.
9. Section I consisted of seven questions, designed to gauge the level of normative pressures exerted by professional bodies and formal education on firms on the adoption of EMA practices. Respondents were asked about the existence of pressures exerted by professional bodies and formal education to adopt EMA practices in their firms. All items are of normative pressures variable measured by using a five-point Likert scale.
10. Section J consisted of seven questions designed to investigate the attention of firms regarding legitimacy considerations. Respondents were asked to rate the extent of the attention given their firms to legitimacy considerations. All the items of this variable were measured by using a five-point Likert scale.
11. Section K consisted of five questions, designed to examine the level of stakeholder pressures exerted by different stakeholders on the firms regarding

the adoption of EMA practices. Respondents were asked about the existence of pressures exerted by stakeholders on the adoption of EMA practices in their firms. The items of this variable were measured by a five-point Likert scale.

### **3.11.2 Measurement and Operationalization of Variables**

This research investigated the situation of EMA adoption within the firms and factors that may affect the adoption, by focusing on firms' behavior toward the intention to adopt EMA. A review of literature shows that several factors may have a significant influence on EMA adoption. However, there is no agreement between researchers about findings related to this issue, and there is urgent need to capture further factors regarding EMA adoption (Chang, 2007; Ferreira *et al.*, 2010).

To overcome this problem, a literature review was undertaken to determine the most important factors that influence the, adoption process, innovations, practices and new ideas. The literature drew attention to the influence of business strategy, nature of formalization, organizational culture, top management support, coercive pressures, normative pressures, legitimacy considerations, stakeholder pressures, the perceived benefits and perceived importance. According to the literature, the factors that may affect the adoption process can be classified into three contexts. The contexts, as explained by Tornatzky and Fleischer (1990), are the technological, organizational and environmental contexts. In the present study, the technological context included perceived benefits and perceived importance factors, while the organizational context included business strategy, nature of formalization, organizational culture, and top management support factors; and the environmental context included coercive

pressures, normative pressures, legitimacy considerations, and stakeholder pressure factors. The literature also reveals that these factors play an important role in the adoption of many organizational practices and innovations. Hence, it is expected that these variables have a significant influence on the adoption process of EMA and in particular on the intention to adopt EMA. Table 3.2 presents the operational definitions of measurement for each variable and their sources.

Table 3.2  
*The Sources of Questionnaire Measurements*

<b>Variables</b>	<b>Definition of Measurement Constructs</b>	<b>Sources</b>
<b>Intention to adopt EMA</b>	The extent of firm's intention to adopt EMA practices which include monetary and physical aspects.	Ferreira <i>et al.</i> (2010)
<b>Perceived importance of EMA</b>	The degree of perceived importance of EMA practices which include monetary and physical aspects.	Ferreira <i>et al.</i> (2010)
<b>Perceived Benefits of EMA</b>	The level of benefits perceived by firm to adopt EMA.	Ferreira <i>et al.</i> (2010)
<b>Top Management Support</b>	The extent of interest, importance, authority, communication, adequate resources and commitment provided by top management to adopt EMA practices.	Baird <i>et al.</i> (2007), Beatty <i>et al.</i> (2001), (Wong & Aspinwall, 2005)
<b>Business Strategy</b>	The classification of the types of strategy based on the firm's administrative systems, technology, market and product strategies.	Ismail (2004), Kober <i>et al.</i> (2007)
<b>Nature of Formalization</b>	The degree to which workers are provided with rules and procedures that deprive versus encourage creative, autonomous work and learning.	Nahm <i>et al.</i> (2003)
<b>Organizational Culture</b>	The classification of the types of Culture based on the firm's integration or internal focus versus differentiation or external focus, and stability and control versus flexibility and discretion.	Cameron & Quinn (1999), Chin-Loy & Mujtaba (2007), Shokshok <i>et al.</i> (2010), Trivellas & Dargenidou (2009)
<b>Coercive Pressures</b>	The level of pressures exerted by government agencies and environmental legislations on the firms on the adoption of EMA practices.	DiMaggio & Powell (1983), Lin (2001), Kokubu (2002), Lapsley & Wright (2004)
<b>Normative Pressures</b>	The level of pressures exerted by professional bodies and formal education, on firms concerning the adoption of EMA practices.	DiMaggio & Powell (1983), Delmas (2002), Li (2004), Bennett <i>et al.</i> (2006)
<b>Legitimacy Considerations</b>	The extent of attention firms give to legitimacy considerations which include enhancement of the relations with society, maintaining their legitimacy, improving their image and maintaining their survival by adopting EMA.	Bansal & Roth (2000), Céspedes-Lorente <i>et al.</i> (2003), Chang (2007)
<b>Stakeholders Pressures</b>	The level of pressures exerted by different stakeholders on the firms regarding the adoption of EMA practices.	Céspedes-Lorente <i>et al.</i> (2003), Chang (2007), Darnall <i>et al.</i> (2009), Delmas <i>et al.</i> (2004b)



### 3.11.2.1 Intention to Adopt EMA Questions

The intention to adopt EMA variable is operationalized to determine the extent to which firms are willing to adopt EMA practices. This variable was operationalized using 12 items validated by Ferreira *et al.* (2010) These items reflect EMA related activities, which were selected and derived from various resources (e.g. IFAC, 2005; UNDSO, 2001), and they focused on two monetary and physical aspects of EMA, as suggested by Burritt *et al.* (2002). This instrument was adapted to measure the extent of intention to adopt EMA practices within Libyan firms. These items were measured using a 5-point Likert scale, ranging from 1 “not intent at all” to 5 “intent to a great extent”. These items are summarized in Table 3.3.

Table 3.3  
*Intention to Adopt EMA Items*

	Items
1	Identification of environment-related costs.
2	Estimation of environmental-related liabilities.
3	Classification of environment-related costs.
4	Allocation of environment-related costs to production processes.
5	Allocation of environment-related costs to products.
6	Introduction of improvement to environment-related costs management.
7	Creation and use of environment-related costs accounts.
8	Development and use of environment-related key performance indicators (KPIs).
9	Product life cycle cost assessments.
10	Product inventory analyses (i.e. the specification of the types and quantities of materials and energy required and the amount released to the environment).
11	Product impact analyses (i.e. assessment of the environmental effect of competing product designs).
12	Product improvement analyses (i.e. identification of opportunities for reduction of environmental impact).

Source: Ferreira *et al.* (2010)

### 3.11.2.2 Perceived Importance of EMA Questions

The survey used similar questions (n=12) developed by Ferreira *et al.* (2010) as shown in the Table 3.3, to measure the perceived importance of EMA. The respondents were asked to assess the degree of importance of EMA practices as

perceived by respondents in the Libyan firms, using a 5-point Likert scale, ranging from 1 “not important at all” to 5 “very important”.

### 3.11.2.3 Perceived Benefits Questions

The perceived benefits of the EMA variable is operationalized to determine the extent to which respondents perceived the benefits of EMA adoption. This variable was operationalized by using a total of 15 items developed by Ferreira *et al.* (2010). These items were measured using a 5-point Likert scale, ranging from 1 “strongly disagree” to 5 “strongly agree”, and are presented in Table 3.4.

Table 3.4  
*Perceived Benefits of EMA Items*

Items	
1	Increased demand for green products.
2	Increase in product margins.
3	Increase in customer satisfaction.
4	Cost of capital reduction.
5	Insurance cost reduction.
6	Operating cost reduction.
7	Identification of new opportunities.
8	Generation of process innovation.
9	Generation of product innovation.
10	Attraction of better quality staff.
11	Improvement in productivity.
12	Improvement in reputation.
13	Improvement in decision making.
14	Product costing improvement.
15	Production process improvement.

Source: Ferreira *et al.* (2010)

### 3.11.2.4 Top Management Support Questions

The top management support variable is operationalized to determine the degree of the interest, importance, authority, communication, adequate resources and

commitment provided by top management on the adoption of new techniques or practices such as EMA.

This variable is operationalized by using six items validated by other researchers (e.g. Baird *et al.*, 2007; Beatty *et al.*, 2001; Wong & Aspinwall, 2005). These items were measured by using a 5-point Likert scale, ranging from 1 “strongly disagree” to 5 “strongly agree”, and are presented in the Table 3.5.

Table 3.5  
*Top Management Support Items*

Items	
1	Top management is interested in the adoption and implementation of EMA.
2	Top management considers EMA practices important to the firm.
3	Top management exercises its authority in support of environmental management accounting.
4	Top management effectively communicates its support for environmental management accounting.
5	Top management provides adequate resources to support environmental management accounting adoption and implementation effort.
6	Top management provides active support for environmental management accounting practices.

### 3.11.2.5 Business Strategy Questions

The typology of Miles & Snow (1978) was used to measure organizational strategy. This typology classifies business strategy into four types - prospector, defender, analyzer and reactor. This typology has been used by many previous researchers, and has been shown as an appropriate means to classify strategies in many industries (Shortell & Zajac, 1990). In line with other studies, this study concentrates on two of the strategies which are considered sitting on opposite sides of a band of various strategies (Abernethy & Guthrie, 1994; Ismail, 2004).

Thus, the prospector and defender typologies were selected for purpose of this study. The categorization of the prospector and defender type is based on the administrative

systems, technology, market, and product strategies of firm. Sixteen items used and validated by Ismail (2004) were measured using a 5-point Likert scales ranging from 1 "Strongly Disagree" to 5 "Strongly Agree". The respondents were asked to indicate to what extent their firms' strategies were inclined to one or the other of items, which are displayed in Table 3.6.

Table 3.6  
*Business Strategy Items*

Strategy Type	Items
<b>Prospector Strategy</b>	<ul style="list-style-type: none"> <li>By maintaining a dynamical and flexible administrative system.</li> <li>By using flexible and multiple technologies.</li> <li>By adopting the latest technology regardless of costs.</li> <li>By expanding into new markets.</li> <li>By responding rapidly to new ideas in the environment.</li> <li>By ensuring quality products rather than price.</li> <li>By introducing new products ahead of others.</li> <li>By having a wider range of products available.</li> </ul>
<b>Defender Strategy</b>	<ul style="list-style-type: none"> <li>By maintaining a stable and simple administrative system.</li> <li>By maintaining cost- efficient technology.</li> <li>By using a single core technology.</li> <li>By focusing on an existing stable market.</li> <li>By moving cautiously on directly relevant changes in the environment.</li> <li>By cheaper pricing of our products.</li> <li>By focusing on improving existing products.</li> <li>By concentrating on a more limited range of products.</li> </ul>

Source: Ismail (2004)

### 3.11.2.6 Nature of Formalization Questions

According to Nahm *et al.* (2003) nature of formalization can be defined as the degree to which workers are provided with procedures and rules which divest versus promote creativity, learning and autonomous labor.

This variable is operationalized using five items which have been validated by Nahm *et al.* (2003) and one items related to performance improvement efforts was added. These items were measured in the terms of a five-point Likert scales ranging from 1

“Strongly Disagree” to 5 “Strongly Agree”. Table 3.7 presents the main items related to nature of formalization.

Table 3.7  
*Nature of Formalization Items*

Items
1 Your organization has written rules and procedures that show how workers can make suggestions for changes.
2 Your organization has written rules and procedures that describe how workers can make changes on their job.
3 Your organization has written rules and procedures that show how workers can experiment with their job.
4 Your organization has written rules and procedures that guide quality improvement efforts.
5 Your organization has written rules and procedures that guide creative problem solving.
6 Your organization has written rules and procedures that guide performance improvement efforts.

Source: Nahm *et al.* (2003)

### 3.11.2.7 Organizational Culture Questions

The measure of organizational culture is based on the instrument proposed by Cameron and Quinn (1999). The Organizational Culture Assessment instrument (OCAI) is one of the most widely used instruments to measure organizational culture (e.g. Cameron & Quinn, 1999; Shokshok *et al.*, 2010; Twati & Gammack, 2006).

OCAI consists of 24 items divided into six parts with four perceptions related to the four main culture types (clan, adhocracy, market and hierarchy), which have been validated by other researchers (Chin-Loy & Mujtaba, 2007; Shokshok *et al.*, 2010; Trivellas & Dargenidou, 2009; Twati & Gammack, 2006).

These items were measured in terms of a five-point Likert scale, ranging from 1 “Strongly Disagree” to 5 “Strongly Agree”. Table 3.8 presents main items related to organizational culture.

Table 3.8  
*Organizational culture Items*

	Items
1	The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.
2	The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.
3	The organization is very result oriented. A major concern is with getting the job done. People are very competitive and achievement-oriented.
4	The organization is very controlled and structured place. Formal procedures generally govern what people do.
5	The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.
6	The leadership in the organization is generally considered to exemplify entrepreneurship, innovating, or risk taking.
7	The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.
8	The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.
9	The management style in the organization considers teamwork, consensus, and participation.
10	The management style in the organization is considers individual risk-taking, innovation, freedom, and uniqueness.
11	The management style in the organization considers hard-driving competitiveness, high demands, and achievement.
12	The management style in the organization considers the security of employment, conformity, predictability, and stability in relationships.
13	The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.
14	The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.
15	The glue that holds the organization together is the emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes.
16	The glue that holds the organization together is formal rules and policies. Maintaining a smooth- running organization is important.
17	The organization emphasizes human development. High trust, openness, and participation persist.
18	The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.
19	The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant.
20	The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.
21	The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people.
22	The organization defines success on the basis of having the most unique or newest products. It is a product leader and innovator.
23	The organization defines success on the basis of the winning in the marketplace and outpacing the competition. Competitive market leadership is key.
24	The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.

Source: Cameron (1999)

### 3.11.2.8 Coercive Pressures Questions

The coercive pressures variable is operationalized to determine level pressures imposed on the firms from the government agencies, and legislations, as suggested by

(DiMaggio & Powell, 1983). Nine items were derived from previous literature to operationalize this variable (e.g. Kokubu, 2002; Lapsley & Wright, 2004; Lin, 2001). These items were measured using a 5-point Likert scale, ranging from 1 “strongly disagree” to 5 “strongly agree”. Table 3.9 presents main items related to coercive pressures.

Table 3.9  
*Coercive Pressures Items*

<b>Items</b>	
<b>1</b>	Government provides effective initiatives to encourage and support the firm to adopt certain environmental and accounting practices to improve environmental performance.
<b>2</b>	Government agencies, such as the Environment Public Authority, provide the needed guidelines that assist the firm to adopt and implement environmental management accounting.
<b>3</b>	The government offers guidelines to encourage the firm to track environment-related costs and properly allocate products and processes.
<b>4</b>	The government provides education and training programs related personnel to motivate the firm to adopt environmental management accounting.
<b>5</b>	Government institutions such as Ministry of Industry provides financial incentives, subsidies and needed facilities to encourage the firm to adopt environmental management accounting practices.
<b>6</b>	Government institutions require the firm to provide information on environmental activities and related costs in the financial accounts.
<b>7</b>	Government agencies monitor the firm's commitment to environmental legislation.
<b>8</b>	The government imposes strict penalties, fines when the firm violates environmental legislations.
<b>9</b>	Environmental legislations and laws compel the firm to adopt certain techniques and practices for the protection of the environment.

### **3.11.2.9 Normative Pressures Questions**

The normative pressures variable is operationalized to determine level pressures imposed on the firms from professional bodies, and formal education, as proposed by DiMaggio & Powell (1983).

A total of 7 items were derived from previous literature to operationalize this variable (e.g. Baird *et al.*, 2007; Bennett *et al.*, 2006; Chang, 2007; Delmas, 2002; DiMaggio & Powell, 1983; IFAC, 2005; Li, 2004). These items were measured using a 5-point

Likert scale, ranging from 1 “strongly disagree” to 5 “strongly agree”. Table 3.10 presents main items related to normative pressures.

Table 3.10  
*Normative Pressures Items*

<b>Items</b>	
<b>1</b>	The professional bodies motivate the firm to adopt environmental management and environmental accounting practices.
<b>2</b>	The professional bodies provide guideline principles and needed information that help the firm on the adoption of environmental management accounting practices.
<b>3</b>	The professional bodies effectively monitor the firm's commitment to the principles and professional standards
<b>4</b>	The professional bodies provide forceful support for training and education requirements to motivate the firm to adopt and implement environmental management accounting practices.
<b>5</b>	The formal education institutions provide adequate knowledge of environmental management accounting practices
<b>6</b>	The formal education institutions effectively contribute to providing appropriate training courses of the firm’s staff on the uses of environmental management accounting
<b>7</b>	The formal education institutions effectively communicate with the firm, and provide advice to solve environmental problems that the firm may face.

### **3.11.2.10 Legitimacy Considerations Questions**

Legitimacy considerations variable is operationalized to determine the extent firms give attention to enhancing the relations, maintaining the legitimacy, gaining the support, improving the image and maintaining the survival by adopting new techniques such as EMA(Chang, 2007).

A total of five items were derived from previous literature to operationalize this variable (e.g. Bansal & Roth, 2000; Céspedes-Lorente *et al.*, 2003; Chang, 2007). These items were measured using a 5-point Likert scale, ranging from 1 “strongly disagree” to 5 “strongly agree”. Table 3.11 presents main seven items that reflect legitimacy considerations.



Table 3.11  
*Legitimacy Considerations Items*

Items	
1	Your firm uses environmentally responsible methods to gain the support, avoid penalties and ensure legitimacy from society.
2	Your firm provides information on environmental performance to justify its internal activities and enhance its relations with stakeholders groups in the society.
3	Your firm follows public policies and rules, in order to improve its image and maintain its reputation in the society.
4	Your firm reduces environmental impacts in order to avoid fines and penalties, lessen risks and satisfy employees.
5	Your firm wishes to lower its environmental impacts and related costs in order to maintain its survival in the society.
6	Your firm adopts and applies the organizational techniques and accounting practices in order to gain the license to operate, ensure survival and achieve long-term sustainability.
7	Your firm wishes to lower its environmental impacts and related costs in order to enhance its relations with stakeholders groups in the society.

### 3.11.2.11 Stakeholder Pressures Questions

The stakeholder pressures variable is operationalized to determine the level pressures imposed on the firms by stakeholders (Chang, 2007). Five items were derived from previous literature to operationalize this variable (e.g. Céspedes-Lorente *et al.*, 2003; Chang, 2007; Darnall *et al.*, 2009; Delmas & Toffel, 2004b). These items were measured using a 5-point Likert scale, ranging from 1 “strongly disagree” to 5 “strongly agree”. Table 3.12 presents the main items of stakeholder pressures.

Table 3.12  
*Stakeholder Pressures Items*

Items	
1	The stakeholders such as customers, shareholders, banks, insurance companies and suppliers threaten the firm with sanctions if it does not reduce the environmental impacts.
2	The stakeholders such as government institutions promise rewards to the firm if improve its environmental behavior.
3	The stakeholders such as environment interested groups, citizens remind the firm of its moral obligation towards the environment protection.
4	The stakeholders encourage your firm to adopt certain techniques and practices to reduce environmental impacts and improve environmental performance.
5	The stakeholders such as government, shareholders, banks, insurance companies and market stock require your firm to provide monetary and non monetary information related to its environmental activities.

### 3.11.3 Reliability and Validity of the Measurement

Reliability assessment was conducted to test the instrument in terms of stability and consistency and to assess the goodness of measure before the distribution of the questionnaire to the respondents (Hair, Black, Babin & Anderson, 2010). Reliability is identified by the degree of the similarity of the results which can be gained by repeating the same scale under different conditions (Crowther & Lancaster, 2009).

Reliability of measurement can be tested by two approaches - test-retest - that is assessed by applying the same instrument to the sample under different conditions and comparing the differences in the results. On the other hand, reliability is measured by examining internal consistency among instruments and items (Pallant, 2007). The coefficient of Cronbach Alpha is commonly used as measure to test the internal consistency reliability of survey instruments (Hair *et al.*, 2007; Pallant, 2007; Saunders *et al.*, 2009; Sekaran & Bougie, 2010). The value of Cronbach's alpha ranges from zero to one and acceptable values are around 0.7, while the value of Cronbach's alpha that is less than 0.6 is generally considered as poor values but can be acceptable for exploratory research (Hair *et al.*, 2007).

The second assessment of the measurement instrument is the validity of measures. The validity of measurement is a test of how well an instrument that is developed measures the particular concept it proposes to measure (Sekaran & Bougie, 2010). Typically, validity test can grouped into two main types, namely content validity, criterion validity and construct validity. Content validity is a test to ensure that the measure involves an adequate and representative set of items from the intended universe (Saunders *et al.*, 2009). It is argued that this can be achieved by using

instruments that were adopted by previous studies. The opinions of academics and experts who have knowledge of the subject, and targeted individuals in the study can be used to assess the content validity and obtain feedback on the survey items, as suggested by Hair *et al.* (2007).

Construct validity includes testing an instrument in terms of the theoretical and hypothetical development related to the relationships among variables (Pallant, 2007). Two approaches that can be used to verify construct validity involve convergent validity and discriminate validity, as proposed by Hair *et al.* (2007). Convergent validity examines whether the main study constructs are positively related to other measures of the constructs, while discriminate validity is a test to determine whether correlations exists between various items of latent constructs (Hair *et al.*, 2007).

In this study, most measures used acceptable instruments widely used in previous literature, and are justified in terms of validity. The definitions of main variables were carefully reviewed in related literature as suggested by Saunders *et al.* (2009). In addition, a pretest was performed by getting feedback from set reviewers who included academicians, experts, students, financial directors and environmental managers in the firms from two selected industry sectors. These reviewers have knowledge of the topic, and based on their comments, some questionnaire items were modified to ensure clarity, familiarity and goodness of the content of the survey.

#### **3.11.4 Pilot Study**

According to Bourque and Fielder (1995), there is a need to pre-test the measures or instruments used by the researcher before the phase of actual data gathering. Most of

the instruments utilized in the present study were developed through a review of previous studies. The intended purpose of a pilot study is to re-evaluate the reliability and validity of the instruments or measures to make necessary modifications to avoid any unforeseen problems. Therefore, a pilot study was carried out to refine the wording of questions and instructions in the questionnaire. This process was also for validation because some parts of the questionnaire had been developed exclusively for the present study. This work is in line with opinions that suggest refining the questionnaire before data collection (Dillman, 1991).

The validity of questionnaire was tested by 13 experts, comprising lecturers, PhD students and researchers in Malaysian universities, namely, Universiti Utara Malaysia, Universiti Kebangsaan Malaysia, Universiti Sains Malaysia, Universiti Pendidikan Sultan Idris, and Universiti Sains Islam Malaysia. Generally, all agreed with the importance and contribution of this study to Libya. Comments given by reviewers focused on the need to make the questionnaire short and easy to answer. The questionnaire was translated into Arabic with the help of colleagues with knowledge of Arabic and English. The researcher discussed the translated draft in Arabic with PhD students whose native language is Arabic.

The two versions - English and Arabic versions - were then sent to expert in the translation process of Arabic and English. The experts were asked to review the cover letter, and the English and Arabic versions of the questionnaire. Except for several grammatical errors, no modifications were made to the contents of the cover letter, or the English and Arabic versions of the questionnaire, and they were satisfied with the wording of the questionnaire items.

Copies of the questionnaire were also distributed to 50 firms in Libya as a sub-sample from the study target population to obtain their feedback. A total of 34 questionnaires were returned after completion, representing a response rate of 68%. The rate response of the pilot study was high and sufficient for such research (Sekaran, 2003). The 34 questionnaires were subjected to analysis procedures to determine the reliability of the instrument. The result showed good reliability for all variables, according to the Cronbach's alpha values; all variables had values higher than 0.70. However, small modifications were made to the legitimacy considerations variable. The number of items related to this variable was reduced to 5 items, instead of 7 items due to misinterpretation of these questions by the respondents. These items were subsequently deleted from the questionnaire to improve the Cronbach's Alpha of this variable. After deleting the two items, data analysis was done using the Statistical Package for the Social Sciences (SPSS). The questionnaire items were carefully examined again, and some questions were reworded. The final version of the questionnaire is in Appendix A.

### **3.12 Data Analysis Method**

Before the data analysis, normality tests and assessment of outliers were performed. Several statistical methods adopted for analyzing the data and testing of hypothesis are explained below.

#### **3.12.1 Descriptive Statistics**

The descriptive statistics were computed to describe the main attributes of the sample data. In this research, descriptive statistics such as frequencies, percentages, ranges, means and standard deviations were used to describe the main features of the firms

and individuals who answered the questionnaire and all variables examined in the study.

### **3.12.2 Factor Analysis**

Factor analysis is described by Hair, Black, Babin and Anderson (2010) as a method of interdependence used to determine the commonalities or underlying patterns in the data, and reduce a large number of variables by summarizing relevant variables in smaller group factors. In this study, factors analysis was performed to examine the validity of the components of the questionnaire, by determining the items that actually measure the concept the study was supposed to measure, as suggested by Sekaran & Bougie (2010). The factor analysis was conducted by using three main steps as proposed by Pallant (2007).

1. Evaluation of the suitability of the data for factor analysis. This can be carried out, mainly by examining the adequacy of the sample size and testing the strength of correlations among variables. Two statistical methods, namely Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, were used to assess factorability of data. The accepted value of Bartlett's test of sphericity was  $p < 0.05$ , and 0.6 was the minimum value of KMO (Tabachnick & Fidell, 2007).
2. Factor extraction was used to determine the smallest number of factors to represent the mutual relations between variables. Principal component analysis was used in this study. This analysis was also used in previous studies (Pallant, 2007). This technique is used to group main variables into clearer

linear variables, and analyze all variance shared by using a mathematical method.

3. Factor rotation and interpretation is the adjustment process of the factor matrix to attain simplification and correlation of factors. A need to replicate rotation occurs in specific cases that have high loadings in more than one factor.

### **3.12.3 Test of Differences**

This study conducted this test to verify the existence of any statistical differences and significance among the variables. The independent sample t-test was conducted to determine the differences in mean values between two different clusters. One-way ANOVA was also used to determine the mean differences between more than two clusters. In this study, the test for differences between early and late respondents was conducted to ensure the responses were not biased (Hair *et al.*, 2010).

### **3.12.4 Correlation**

This analysis is used to assess the relationship between two variables (Hair *et al.*, 2010). Correlation analysis was used to determine interrelationships among the variables in this study. The main purpose of correlation testing was to determine the direction and strength of the relationships between variables in the study. Besides, correlation analysis was carried out to detect any multicollinearity among different variables. In this study, correlation tests between independent variables and the dependent variable were performed, by using Person correlation method.

### **3.12.5 Multiple Regression Analysis**

Multiple regression is used to examine the impact of independent variables on one single dependent variable (Pallant, 2007). According to Hair *et al.* (2010), multiple regression is a statistical method to analysis the relationships between several independent (or predictor) variables and a single dependent (or criterion) variable. This study employed multiple regression to examine the influence of independent variables on the dependent variable and the interrelationships between different variables (Hair *et al.*, 2010).

### **3.13 Chapter Summary**

This chapter has discussed the research framework; and the hypotheses of the study based on existing literature. This chapter has also described the methodology and research design used in this study. Then the population and sample of this study were then described, followed by details on the data collection procedure, development of measure instruments, and statistical techniques used in the data analysis. The findings of the data analysis are presented in the next chapter.



## CHAPTER FOUR

### ANALYSIS AND FINDINGS

#### 4.1 Introduction

The aims of this chapter are to present the findings of the analysis of the data and report the descriptive results of the questionnaire survey. The statistical package for social sciences SPSS 20 was applied to the data analysis process. In this chapter, the profile of sample is described, followed by culture profile and goodness of measure for the main variables. The descriptive statistics of all the variables are then presented.

#### 4.2 Response Rate

As mentioned earlier in Chapter Three, the initial sample comprised of 354 respondents working in 177 firms. However, 15 firms (about 30 questionnaires) were not able to deliver the questionnaires to them. Some firms had changed their addresses while others had closed or could not be located. After excluding 30 questionnaires from the initial sample, the researcher personally distributed a total of 324 questionnaires to the Libyan firms. A total of 221 questionnaires were returned but 12 questionnaires were unusable and excluded, because the questionnaires had not been completed.

After excluding the 12 questionnaires, 209 questionnaires (64.5%) were used in the present study. The response rate of 64.5% was considered satisfactory when compared to other studies in the Libyan context (Hokoma *et al.*, 2008a, 2008b, 2010;

Sayeh, 2006; Twati, 2007, 2008; Twati & Gammack, 2006; Youssef, 2006). For example, Twati (2007) reported a response rate of 66%. Thus, the response rate of this study is considered acceptable (See Table 4.1).

Table 4.1  
*Sample Frame and Response Rate*

Population of Study	177 Firms
Sample Frame (177×2=354)	354 Respondents
Undelivered Questionnaires	<30>
Distributed Questionnaires	324
Total Response	221
Uncompleted Questionnaires	<12>
Total Before Data Entry	209
Initial Response Rate	64.5%
Outlier	<7>
Usable Questionnaires	202
Final Response Rate	62.3%

#### 4.2.1 Screening and Cleaning of Data

The data screening and cleaning were conducted before the data analysis to identify errors and outliers, as recommended by Field (2000) and Tabachnick and Fidell (2007). First, the data files were screened for accuracy by proofreading the original data against the computerized data file in the data window.

After that, the data were checked for accuracy by using the descriptive statistics mode of SPSS frequencies. One of the most pervasive problems of the data analysis was missing data values. Each missing value was treated by using substitution means method for each missing variable as suggested by several researchers (e.g. Hair *et al.*, 2010; Tabachnick & Fidell, 2007).

The data were checked for outliers and normality by using a descriptive test. According to Zikmund (2003), outliers are related to values which lie outside the

normal range of data. For this study, outliers were detected using the box plots and 7 questionnaires were shown as extreme values and were excluded from the final analysis. After excluding these cases, there were 202 final usable questionnaires, representing 62.3% of the total questionnaires distributed (See Table 4.1).

The test of normality was also conducted to explore the Skewness and Kurtosis ratios of the data. Positive kurtosis values indicate the peak of distribution while the negative values indicate flatness of distribution. A positive skewness is shown if the values are shifted to the left side, while a negative skewness is indicated if the values are skewed to the right side. Table 4.2 presents the results of normality test, including the Skewness and Kurtosis values.

Table 4.2  
*Normality Test of Skewness and Kurtosis Ratios*

Variables	N	Mean	Skewness		Kurtosis	
			Statistic	Std. Error	Statistic	Std. Error
Perceived Importance of EMA (PIEMA)	202	3.55	-.225	.171	-1.029	.341
Intention to adopt EMA (ITAEMA)	202	3.36	.170	.171	-.700	.341
Perceived Benefits of EMA (PBEMA)	202	3.57	-.047	.171	-.903	.341
Top Management Support (TMS)	202	3.38	.145	.171	-.697	.341
Prospector Strategy (PS)	202	3.37	-.127	.171	-.643	.341
Defender Strategy (DS)	202	3.49	-.133	.171	-.092	.341
Nature of Formalization (NF)	202	3.27	-.136	.171	-.528	.341
Clan Culture (CC)	202	3.54	-.331	.171	-.835	.341
Adhocracy Culture (AC)	202	2.83	.078	.171	-1.033	.341
Market Culture (MC)	202	3.55	-.019	.171	-1.150	.341
Hierarchy Culture (HC)	202	4.22	-.585	.171	-.967	.341
Coercive Pressures (CP)	202	3.08	-.031	.171	-.721	.341
Normative Pressures (NP)	202	3.10	-.143	.171	-.591	.341
Legitimacy Considerations (LC)	202	3.30	-.040	.171	-.672	.341
Stakeholders Pressures (SP)	202	3.04	.142	.171	-.752	.341
Valid N (listwise)	202	202				

The results (as shown in Table 4.2) showed no serious violations or values that exceeded the acceptable range of skewness suggested by Hair *et al.* (2010), ranging

between  $\pm 1.96$  at 0.05 significance level or between  $\pm 2.58$  at the 0.01 significance level. The normal range of kurtosis ranges between  $\pm 3$ . In addition, Hair *et al.* (2010) pointed out that for a sample size of 200 or more, researchers can be less worried about the normal distribution of variables. Building on the results of skewness and kurtosis, the data of this study were normal distributed, hence can be used for further analysis.

#### **4.2.2 Non-response Bias Test**

A non-response bias test was done to find out whether there were any significant differences between early and late respondents on major variables, as any difference and bias may have an effect on the interpretation of the variables as well as overall results of the data analysis.

The questionnaires, which were returned before the due date, were considered as early responses; while the questionnaires which were returned two weeks after a reminder were considered as late responses. For this study, 134 questionnaires were received before the reminder, and were classified as the early responses, while 68 questionnaires were subsequently received after the reminder, were classified as the late responses.

Hair, *et al.* (2007), suggested using the P value to determine if there are any differences between two samples. Therefore, an Independent-Sample T Test was undertaken to investigate whether there were any significant differences between the mean scores of early respondents and late respondents. Table 4.3 presents the results of non-response bias, while the rest of the results are shown in Appendix C.

Table 4.3  
*Independent Sample t-test of Variables*

Variables	Levene's Test for Equality of Variances		Significance at level 95%
	F	Sig.	
Perceived Importance of EMA (PIEMA)	.397	.530	Not Significant
Intention to adopt EMA (ITAEMA)	1.833	.177	Not Significant
Perceived Benefits of EMA (PBEMA)	.709	.401	Not Significant
Top Management Support (TMS)	.041	.840	Not Significant
Prospector Strategy (PS)	1.169	.281	Not Significant
Defender Strategy (DS)	2.194	.140	Not Significant
Nature of Formalization (NF)	1.872	.173	Not Significant
Clan Culture (CC)	.262	.609	Not Significant
Adhocracy Culture (AC)	1.147	.286	Not Significant
Market Culture (MC)	1.143	.286	Not Significant
Hierarchy Culture (HC)	.127	.722	Not Significant
Coercive Pressure (CP)	1.187	.277	Not Significant
Normative Pressure (NP)	1.206	.274	Not Significant
Legitimacy Considerations (LC)	.204	.652	Not Significant
Stakeholders Pressure (SP)	.539	.464	Not Significant

As shown in Table 4.3, there were no significant differences between early and late respondents. Most of the variances for all variables were above the significant level of 0.05 ( $p > .05$ ), ranging from 0.140 to 0.840. Hence, there were no concerns regarding the non-response bias issue between early and late respondents in this sample. This study also conducted the T test (Independent Samples Test), to test whether there was any difference, statistically between (1) the respondents' gender difference (Male and Female); (2) the respondents' designations (financial directors and environmental managers). There was no significant difference between two groups in gender, and in function, as shown in Appendix C.

The one-way analysis of variance (ANOVA) was also conducted to test whether there was any difference statistically in other demographic characteristics of the respondents, for example, age, educational level, and job position. The ANOVA results showed that there was no significance statistically, at the  $p > .05$  for all groups. The details of the T test and ANOVA are in Appendix D.

### **4.2.3 Respondents' Profile**

The findings showed that the majority of the respondents were men (87.1%) and a considerably smaller number were women (12.9%). This ratio is consistent with Libyan and Arabic culture regarding the management and decision-making, where males dominate the management positions and professional jobs, like accounting. This finding is consistent with that of Twati (2007), who found there were restrictions for females compared to males in Libya and the Arab Gulf region, where very few females were holding management positions.

In addition, 6.4% of the respondents were less than 30 years old, 33.2% were in the 30 to 40 range, and 35.6% the respondents were in the 41 to 50 age group, 24.8% were more than 50 years old. 60.4% of the respondents were over 40 years old. It seems that older workers tend to value stability, control and resist any changes to work.

The results also reveal that the majority of the respondents were holding university or post-graduate level qualifications. 71.8% of the respondents had Bachelor Degrees and 15.3% had Masters Degrees, only 12.9% had high school qualifications.

This indicates that those in the financial and environmental management positions in Libyan companies had higher education which potentially facilitates EMA adoption.

And 63.4% of the respondents were financial directors and 36.6% were environmental managers, indicating that the response rate by directors in financial management was higher than their counterparts in environmental management, and this suggests that they would be familiar with the content of the questionnaire items. On the other hand, the findings observed that 48.5% of participants had more than 10 years' experience

as managers, 25.5% of the respondents had worked for 6 to 10 years, and 11.9% of the respondents, between 3 to 5 years, and 13.9% had been in their positions for less than 3 years.

This finding suggests that many managers in Libyan companies' had been in their positions for a considerable length of time, and their views could affect the adoption of EMA. Generally, older managers favour stability, control and resist any changes or the adoption of innovations. Table 4.4 below demonstrates the frequencies and percentages of the respondents' profile.

Table 4.4  
*Profile of Respondents*

<b>Characteristic</b>	<b>Classification</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>	Male	176	87.1
	Female	26	12.9
	<b>N</b>	<b>202</b>	<b>100%</b>
<b>Age</b>	Less than 30	13	6.4
	30- 40	67	33.2
	41-50	72	35.6
	More then 50	50	24.8
	<b>N</b>	<b>202</b>	<b>100%</b>
<b>Education Level</b>	High School	26	12.9
	Bachelor Degree	145	71.8
	Master Degree	31	15.3
	<b>N</b>	<b>202</b>	<b>100%</b>
<b>Function</b>	Financial Directors	128	63.4
	Environmental Managers	74	36.6
	<b>N</b>	<b>202</b>	<b>100%</b>
<b>Tenure in Position of respondent</b>	Less than 3 years	28	13.9
	3 - 5 years	24	11.9
	6 - 10 years	52	25.7
	More than 10 years	98	48.5
	<b>N</b>	<b>202</b>	<b>100%</b>

### 4.3 Firms' Profile

Table 4.5 below reveals that 21.3% of the respondents were from the oil and gas sector, and 78.7% from the manufacturing sector which includes: Chemical Industries

16.8%, Cement and Building Material 16.3%, Food Industries 24.8%, Geometric and Electrical Industries 9.4%, and Metal Industries 11.4 % respectively. The results showed that two types of organizations were surveyed in this study. 57.4% of the organizations were fully owned by the government and 42.6% were mixed, jointly owned by the government and private sector, and none were from the private sector.

The organization sizes in this study were as follows: 1.5% had less than 200 employees; 5.5%, less than 300, 6.4%, less than 400, 18.3%, less than 500; and 68.3%, had more than 500 employees. The figures in Table 4.5 provide insight into the EMA adoption status of the firms surveyed. The result below shows that all of the firms in this study did not adopt any EMA practices.

Table 4.5 also illustrates that the mean scores; standard deviations of the four types of organizational culture include clan, adhocracy, market and hierarchy into oil and manufacturing firms. The results show that hierarchy organizational culture with the highest scores in the oil and manufacturing sectors was the dominant culture. This is because most firms in both sectors were fully owned by the government and were large in size.

There were no privately-owned firms, and even the mixed organizations were owned by the government. This suggests that the employees in the oil and manufacturing sectors lack commitment and empowerment, morale, and group cohesiveness, while they are more inclined to stability, control, centralization in decision-making, formalized structures, rules and regulations and internal focus.



Table 4.5  
*Profile of Firms*

<b>Profile</b>	<b>Classification</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Industry Sector</b>	Oil and Gas	43	21.3
	Chemical Industries	34	16.8
	Cement & Building Material	33	16.3
	Food Industries	50	24.8
	Geometric & Electrical Industries	19	9.4
	Metal Industries	23	11.4
	<b>N</b>	<b>202</b>	<b>100%</b>
<b>Property</b>	Government	116	57.4
	Mixed	86	42.6
	<b>N</b>	<b>202</b>	<b>100%</b>
<b>Size</b>	100-200	3	1.5
	201-300	11	5.5
	301-400	13	6.4
	401-500	37	18.3
	>500	138	68.3
	<b>N</b>	<b>202</b>	<b>100%</b>
<b>Status of EMA adoption</b>	Yes	–	–
	No	202	100%
	<b>N</b>	<b>202</b>	<b>100%</b>
<b>The Dominate Culture</b>	<b>Classification</b>	<b>Mean</b>	<b>S. D.</b>
	Clan Culture	3.548	.9072
	Adhocracy Culture	2.825	1.0581
	Market Culture	3.554	.9517
	Hierarchy Culture	4.217	.8306
	<b>N</b>	<b>202</b>	<b>100%</b>

#### 4.4 Measurements Goodness

The goodness and suitability of the measurement instrument are major issues that a researcher must take into consideration. This can be tested by using the validity and reliability tests of the measurement constructs.

##### 4.4.1 Validity

The concept validity can be explained as the extent to which a set of measures is free from any systematic or non random errors (Hair *et al.*, 2010). The test of validity is important and essential for insuring a valid tool employed in the research. The validity of the instrument can be classified into two main categories namely content validity

and construct validity. The content validity is the extent to which the instrument or measurement provides adequate coverage of the topic under study, i.e. it is concerned with the content of the measurement as it should measure what it is supposed to measure (Das, Paul & Swierczek, 2008). To evaluate content validity of an instrument, the researcher must first agree on what elements constitute adequate coverage of the problem (Sekaran, 2003).

According to Sekaran (2003), content validity can be measured through the judgment of those who construct the instrument or other experts familiar with the topic area, conceptualization of the behavioral domain or universe of interest, and high internal consistency reliability.

For the purpose of this study, the definitions of the main variables were carefully reviewed from related literature as suggested by Saunders et al. (2009). The researcher also ensured the content validity based on views and feedbacks from academicians, PhD students in Malaysian universities, experts and managers in Libyan oil and manufacturing firms.

Whereas, construct validity concerns the accuracy of the measurement to provide confidence that measures taken from a sample represent the true score that exists in the population (Hair *et al.*, 2010). For achieving construct validity by principle component analysis factor loading for each item should be at least 0.40 for the posited construct. With regard to this study, the findings of factor analysis clearly showed that each item of all variables had a high loading on its factor (each loading value is greater than 0.40).

#### 4.4.2 Reliability

Reliability is considered the most important factor, being the most widely used measure. According to Hair *et al.* (2010) reliability is an assessment of the degree of consistency between multiple measurements of a variable. Babbie (2012) states that regardless of whenever the same measures are applied repeatedly, the same results should be obtained over a different period of time. Researchers are using Alpha coefficient to measure reliability. Cronbach's alpha ranges between 0 and 1. The acceptable value of Cronbach's alpha coefficient in general is 0.70 for the research (Hair *et al.*, 2010; Pallant, 2005).

Table 4.6 presents the reliability statistics for all variables. The lowest Cronbach's alpha is 0.860 and the highest Cronbach's alpha is 0.975, suggesting that the constructs of all variables have good internal consistency. Detailed reliability results are in Appendix E.

Table 4.6  
*Summary of Reliability Statistics of All Variables*

<b>Variables and Dimension</b>	<b>Number of Items</b>	<b>Cronbach's Alpha(<math>\alpha</math>)</b>
Perceived Importance of EMA (PIEMA)	12	.959
Intention to Adopt EMA (ITAEMA)	12	.970
Perceived Benefits of EMA (PBEMA)	15	.975
Top Management Support (TMS)	6	.965
Business Strategy (BS) (over all)	16	.939
Prospector Strategy (PS)	8	.946
Defender Strategy (DS)	8	.917
Nature of Formalization (NF)	6	.937
Organizational Culture (OC) (overall)	24	.860
Clan Culture (CC)	6	.964
Adhocracy Culture (AC)	6	.948
Market Culture (MC)	6	.942
Hierarchy Culture (HC)	6	.968
Coercive Pressures (CP)	9	.958
Normative Pressures (NP)	7	.958
Legitimacy Considerations (LC)	5	.897
Stakeholders' Pressures (SP)	5	.927

#### **4.4.3 Factor Analysis**

Factor analysis was applied to check the number of dimensions conceptualized, as well as to test the reliability and construct validity for this study. Factor analysis is a technique of interdependence, whose major objective is to identify the underlying structures among the variables in the analysis (Hair *et al.*, 2010). Tabachnick and Fidell (2007) state that factor analysis is a statistical technique applied to a single set of variables if researcher wants to discover the subsets of variables that are relatively independent of each other.

In the present study, the factor analysis was used to examine unidimensionality, to reduce data for measurement and modification of an existing scale and determine the validity of a construct. Furthermore, factor analysis was used to reduce the large number of variables within smaller and more manageable groups of factors (Hair *et al.*, 2010).

Several requirements should be available before applying factor analysis. The first requirement is the sample size should not be below ten times of the variables in each factor test. According to Hair *et al.* (2010), the acceptable ratio among the variables of the sample size which are to be analyzed must be at least 1:10.

In this study, it was found that the major variables used in the factor analysis test were 15 variables. Moreover, to conduct factor analysis, there should be at least 150 respondents in the sample. The number of respondents in this study was 202, and the ratio between the size of sample and the variables used in factor analysis was 1:13. Therefore, the first requirement for applying factor analysis test was met.

Another requirement for factor analysis relates to the type of data used in this test, and metric measurement should be used, as proposed by Hair *et al.* (2010). In this study, all the variables used in factor analysis had adopted metric measure; thus, factor analysis can be performed. Another requirement for factor analysis is that the variables must have adequate correlations.

Hair *et al.* (2010) suggested using a number of tests to ascertain the factorability of the correlation matrix, which are Kaiser-Meyer-Olkin (KMO), Bartlett Test of Sphericity (BTS) and Measure of Sampling Adequacy (MSA). Kaiser Meyer Olkin (KMO) is one of measures to quantify the degree of intercorrelation between the variables and the appropriateness of factor analysis. A small value of MSA indicates each variable cannot be explained or predicted by the other variables without significant errors, hence; factor analysis might not be an appropriate option. Individual variables with MSA values below 0.50 are unacceptable.

In this context, Kinnear and Gray (1994) argue that the MSA value should be greater than 0.50 for the factor analysis to be suitable. Hair *et al.* (2010) consider MSA values as meritorious if they are in the 0.80s or above, middling if they are in the 0.70s, mediocre if it is in the 0.60s, miserable if they are in the 0.50s and unacceptable if they are below 0.50.

Factor loadings created from factor analysis are utilized to show the correlation between each attribute and each score, the higher the factor loading the more significant that attribute is in interpreting the factor matrix (Hair *et al.*, 2010). Factor loading of values must exceed 0.5 for each item. In this area, Tabachnick and Fidell (2007) argue that, values of 0.6 and above are required for good factor analysis.

Additionally, Hair *et al.* (2010) indicate that the variables generally should have communalities of greater than 0.50 to be retained in the analysis, and minimum the eigenvalues of 1.0 for the each dimension or variable. Table 4.7 displays the percentage of variance explained, MSA and eigenvalues of the variables.

Table 4.7  
*Results of Percentage of Variance Explained, MSA and Eigenvalues*

<b>Variables and Dimensions</b>	<b>Percentage of variance explained</b>	<b>MSA</b>	<b>Eigenvalues</b>
PIEMA	69.246	0.940	8.310
ITAEMA	75.745	0.939	9.089
PBEMA	74.374	0.937	11.156
TMS	85.035	0.891	5.102
PS	73.090	0.924	8.424
DS	63.390	0.887	2.527
NF	76.434	0.880	4.586
CC	84.886	0.930	3.575
AC	79.600	0.922	2.625
MC	77.576	0.887	2.271
HC	87.205	0.926	11.360
CP	74.909	0.935	6.742
NP	79.838	0.926	5.589
LC	70.933	0.889	3.547
SP	77.481	0.850	3.874

The following sections display the factor analysis for each individual variable and dimension, and the results indicated that the items of the each dimension or variable were unidimensional as they loaded satisfactory on a single factor above 0.60. In addition, overall MSA was above 0.80, meaning that all variables had sufficient intercorrelation. The communalities were questions greater than 0.50, and eigenvalues values more than 2 for the each dimension or variable.

Since the loading ranged from 0.705 to 0.942, which could be considered significant for the sample size of this study, therefore unrotated factor was used. The detailed results of factor analysis for major variables are shown in the next sections.

#### **4.4.3.1 Factor Analysis of Business Strategy**

In this section, factor analysis was performed on the sixteen items that measured the business strategy variable to determine whether they could be loaded on a single factor. These items were subjected to following criteria namely factor loading greater than 0.5 and there should be no cross-loading of variables (Hair *et al.*, 2010).

The factor analysis was conducted using the principal component analysis and Varimax rotation with Kaiser Normalization. The Varimax rotation criterion was used to simplify the items or variables of each factor and help to make them more meaningful (Hair *et al.*, 2010). KMO MSA and BTS were tested to find out if factor analysis was appropriate for business strategy items. Eigenvalues and a scree plot were used to support extraction results.

The outputs of these tests are presented in Table 4.8. Table 4.8 shows that KMO MSA for the business strategy variable had a value of 0.918, considered 'meritorious' and appropriate for conducting factor analysis. The value of BTS was also very large (2534.167) and significant (.000).

Latent root criterion and based on the varimax rotation with Kaiser Normalization and cut-off of 0.40 were used for item scale selection. Two distinct principal components were extracted for business strategy. The eigenvalues for each factor were more than one.

Table 4.8  
*Factor Analysis for Business Strategy*

Items	Factor Loading	
	Component 1	Component 2
	Prospector	Defender
Ensuring quality products rather than price.	.808	
Introducing new products ahead of others.	.841	
Having a wider range of products available.	.840	
Expanding into new markets.	.817	
Responding rapidly to new ideas in the environment.	.813	
Adopting the latest technology regardless of costs.	.763	
Using flexible and multiple technologies.	.813	
Maintaining a dynamical & flexible administrative system.	.865	
Cheaper pricing of our products.		.705
Focusing on improving existing products.		.743
Concentrating on a more limited range of products.		.784
Focusing on an existing stable market.		.792
Moving cautiously on directly relevant changes in the environment.		.758
Maintaining the existing cost-efficient technology.		.788
Using a single core technology.		.756
Maintaining a stable & simple administrative system.		.780
Eigenvalues	8.424	2.527
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.918
Bartlett's Test of Sphericity. Approx. Chi-Square		2534.167
df		120
Sig.		.000
Percent of variance explained (%)		68.441

The results in Table 4.8 show that 16 items used to measure business strategy were formed to two separated factors as predicted. Factor 1 consisted of eight items related to prospector strategy; so it was labeled as 'Prospector Strategy'. Factor 2 had also eight items related to defender strategy; therefore, this factor was labeled as 'Defender Strategy'.

All items had a factor loading of more than 0.50, indicating that the items correlated very significantly to the factor itself with factor loadings ranging from .705 to .865, which explained approximately 70 per cent of the overall variance. Factor loading test indicated that each factor consisted of the same original eight items used to measure two business strategy types.



#### 4.4.3.2 Factor Analysis of Nature of Formalization

Similarly, a factor analysis was also conducted for all six items that measured the nature of formalization to find out whether they could be measured as a single variable. The test was conducted using the principal component analysis and Varimax rotation with Kaiser Normalization. In order to test the of factor suitability analysis for nature of formalization, KMO MSA and BTS were conducted. Eigenvalues and plot scree were used to support the extraction results. The results are shown in Table 4.9.

Table 4.9  
*Factor Analysis for Nature of Formalization*

Items	Factor Loading
	Component 1
Written rules and procedures showing how workers can make suggestions for changes.	.872
Written rules and procedures describing how workers can make changes on their job.	.870
Written rules and procedures showing how workers can experiment with their job.	.882
Written rules and procedures guiding quality improvement efforts.	.890
Written rules and procedures guiding creative problem solving.	.885
Written rules and procedures guiding performance improvement efforts.	.846
Eigenvalues	4.586
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.880
Bartlett's Test of Sphericity. Approx. Chi-Square	1080.999
df	15
Sig.	.000
Percent of variance explained (%)	76.434

Table 4.9 shows that KMO MSA for organizational structure items had a value of .880, considered 'meritorious' and thus appropriate for factor analysis. Furthermore, BTS value was large (1080.999) and the significance level was in (.000). These values of KMO MSA and BTS indicated that factor analysis could be conducted on the items and was suitable for nature of formalization variable. The results of the test also show that there was one factor with an eigenvalue of greater than one, based on latent root

criterion. The results also demonstrate that all the six items predicted to measure the nature of formalization were loaded on a single factor alone. All the items had a factor loading of more than 0.50, ranging from .846 to .890 which explained over 76% of the total variance. This indicates that these items correlated very significantly with the factor itself. These results confirm that the six items of the nature of formalization measured the same variable as predicted.

#### 4.4.3.3 Factor Analysis of Organizational Culture

Similar procedures as in earlier section were utilized to determine underlying dimensions for items representing organizational culture. The values of KMO MSA, BTS, eigenvalues and factor loadings are reported in Table 4.10. The results in Table 4.16 show that KMO MSA for organizational culture variable had a value of 0.929, considered ‘meritorious’ and appropriate for conducting factor analysis. The value of BTS was also very large (5632.276) and significant (.000).

Table 4.10  
*Factor Analysis for Organizational Culture*

Items	Component			
	1	2	3	4
	Hierarchy	Clan	Adhocracy	Market
The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.		.897		
The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.		.889		
The management style in the organization considers teamwork, consensus, and participation.		.904		
The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.		.870		
The organization emphasizes human development. High trust, openness, and participation persist.		.879		
The organization defines success on the basis of the development of human resources, teamwork, employee commitment, & concern for people.		.861		
The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.			.727	

Table 4.10 (Continued)

The leadership in the organization is generally considered to exemplify entrepreneurship, innovating, or risk taking.	.859			
The management style in the organization considers individual risk-taking, innovation, freedom, and uniqueness.	.811			
The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.	.870			
The organization emphasizes acquiring new resources and creating new challenges. Trying new things & prospecting for opportunities are valued.	.831			
The organization defines success on the basis of having the most unique or newest products. It is a product leader and innovator.	.863			
The organization is very result oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.	.804			
The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.	.825			
The management style in the organization considers hard-driving competitiveness, high demands, and achievement.	.818			
The glue that holds the organization together is the emphasis on achievement and goal accomplishment.	.799			
Aggressiveness and winning are common themes.				
The organization emphasizes competitive actions and achievement. Hitting stretch targets & winning in the marketplace are dominant.	.845			
The organization defines success on the basis of the winning in the marketplace and outpacing the competition. Competitive market leadership is key.	.799			
The organization is a very controlled and structured place. Formal procedures generally govern what people do.	.875			
The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.	.890			
The management style in the organization considers security of employment, conformity, predictability, and stability in relationships.	.882			
The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.	.905			
The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.	.884			
The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.	.893			
Eigenvalues	11.360	3.575	2.625	2.271
Kaiser-Meyer-Olkin Measure of Sampling Adequacy				.929
Bartlett's Test of Sphericity. Approx. Chi-Square				5632.276
df				276
Sig.				.000
Percent of variance explained (%)				82.631

The results indicated that factor analysis could be conducted and could fit organizational culture items. Using latent root criterion and based on varimax rotation with Kaiser Normalization, four distinct principal components were extracted for organizational culture. The eigenvalues for each factor were more than one.

The results in Table 4.10 also show that 24 items used to measure organizational culture were loaded on four separate factors as predicted. Factor (1) had the six items related to hierarchy culture; therefore, this factor was labeled as “Hierarchy”. Factor (2) consisted of six items related to clan culture; so it was labeled as “Clan”. Factor (3) had six items related to Adhocracy culture; therefore this factor was labeled as “Adhocracy”. Factor (4) had also six items and all of them were related to market culture; hence, this factor was labeled as “Market”.

Each factor consisted of the same original six items related to the organizational culture archetypes, and four components were extracted, precisely matching the number of constructs included in OCAI of Cameron and Quinn (1999). All items had factor loadings of more than 0.50, indicating that the items correlated very significantly with each factor itself, with factor loadings ranging from .727 to .905 which explained over 82 per cent of the overall variance.

#### **4.4.3.4 Factor Analysis of Top Management Support**

The same steps as in the earlier section were performed to identify underlying dimensions for six items representing the top management support variable. The values of KMO MSA, BTS, eigenvalues and factor loadings are reported in Table 4.11.

Table 4.11  
*Factor Analysis for Top Management Support*

Items	Factor Loading
	Component 1
Interested in EMA adoption.	.909
Considered EMA important to firm.	.910
Exercised its authority in support EMA.	.931
Effectively communicated to its support for EMA.	.942
Provided adequate resources to support EMA adoption efforts.	.923
Provided active support for EMA.	.917
Eigenvalues	5.102
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.891
Bartlett's Test of Sphericity. Approx. Chi-Square	1493.547
df	15
Sig.	.000
Percent of variance explained (%)	85.035

Table 4.11 shows that the KMO MSA value for top management support items was 0.89, considered 'meritorious' according to Hair *et al.* (2010) as it was in the 0.80s. The value of BTS was very great (1493.547) and significant ( $p < .001$ ). The values of both KMO MSA and BTS indicated that the top management support items were suitable for factor analysis.

The results also revealed that there was one factor with an eigenvalue greater than one. All of the six items used to measure top management support loaded together on a single factor as predicted. All items had a factor loading of more than 0.50, meaning that items correlated very significantly with the factor itself, with factor loadings ranging from .909 to .942 and about 85.035 % of the variance. These results confirm that these items measured one variable.

#### 4.4.3.5 Factor Analysis of Coercive Pressure

Similarly, a factor analysis was also conducted for all nine items that measured coercive pressures to find out whether they could be measured as a single variable.

The principal component analysis and Varimax rotation with Kaiser Normalization was adopted in this test. In order to test the suitability of factor analysis for coercive pressures, KMO MSA and BTS were conducted. Eigenvalues and plot scree were used to support the extraction results. The results are reported in Table 4.12.

Table 4.12  
*Factor Analysis for Coercive Pressures*

Items	Factor Loading
	Component 1
Provide effective initiatives to support environmental & accounting practices.	.849
Provide guidelines to adopt EMA.	.852
Provide guidelines related to track and allocate environment costs.	.882
Provide educating and training programs for EMA adoption.	.861
Provide financial incentives, subsidies and facilities for EMA adoption.	.858
Require info on environmental activities & related costs in financial accounts.	.902
Monitor firm's commitment to environmental legislation.	.886
Impose strict penalties & fines if the firm violates environmental laws.	.881
Oblige the firm to adopt environmental practices.	.816
Eigenvalues	6.742
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.935
Bartlett's Test of Sphericity. Approx. Chi-Square	1817.946
df	36
Sig.	.000
Percent of variance explained (%)	74.909

Table 4.12 shows that KMO and MSA for coercive pressures items had a value of .935 considered 'meritorious' and thus appropriate for conducting factor analysis. Furthermore, the BTS value was very large (1817.946) and the significance level was in  $p < .001$ . This means factor analysis could be conducted on the items and suitable for the coercive pressures variable. The results of the test also demonstrate that there was one factor with an eigenvalue of more than one, based on the latent root criterion, and all the nine items predicted to measure coercive pressures were loaded on a single factor alone. All of these items had a factor loading of more than 0.50, ranging from .816 to .902 which explained over 74 % of the total variance. This result indicates that these items correlated very significantly with the factor itself, and measured the coercive pressures as predicted.

#### 4.4.3.6 Factor Analysis of Normative Pressures

Similar steps of factor analysis were also conducted for all seven items related to normative pressures to determine if they could be measured as a single variable. The test was performed using the principal component analysis and the Varimax rotation with Kaiser Normalization. The KMO MSA and BTS were tested to assess the suitability of factor analysis for normative pressures. Furthermore, eigenvalues and plot scree were used to support the extraction results. The results are displayed in Table 4.13.

Table 4.13  
*Factor Analysis for Normative Pressures*

Items	Factor Loading
	Component 1
Motivating the adoption of environmental management and accounting practices.	.885
Providing guidelines, principles and information for adoption of EMA.	.928
Effective monitoring of firm's commitment to professional standards.	.918
Providing suitable training & education on EMA by professional bodies.	.887
Providing adequate knowledge about EMA by formal education institutions.	.895
Providing appropriate training courses on EMA by formal education institutions.	.869
Effectively communicating with the firm to solve environmental problems.	.872
Eigenvalues	5.589
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.926
Bartlett's Test of Sphericity. Approx. Chi-Square	1482.271
df	21
Sig.	.000
Percent of variance explained (%)	79.838

Table 4.13 shows that KMO MSA for normative pressures items had a value of .926, considered 'meritorious' and thus suitable for conducting factor analysis. Furthermore, BTS value was large (1482.271) and the significance level was in  $p < .001$ . The values of both KMO MSA and BTS indicated that factor analysis could be conducted and appropriate for normative pressures items. The results of the test also demonstrate that there was one factor with an eigenvalue of greater than one based on latent root criterion. The results in Table 4.13 also demonstrate that all the seven items predicted

to measure normative pressures were loaded on a single factor alone. All items had a factor loading of more than 0.50, ranging from .869 to .928 which explained over 79 % of the variance. This indicates that seven items correlated very significantly with the factor itself, and measured the normative pressures as predicted.

#### 4.4.3.7 Factor Analysis of Legitimacy Considerations

Following similar procedures described in the previous section, a factor analysis was also conducted for all five items that measured legitimacy considerations to find out whether they could be measured as a single variable. The principal component analysis and Varimax rotation with Kaiser Normalization was used for the factor analysis. KMO MSA and BTS were conducted to test the appropriateness of the factor analysis for legitimacy considerations. Eigenvalues and plot scree were used to support the extraction results. The results are reported in Table 4.14.

Table 4.14  
*Factor Analysis for Legitimacy Considerations*

Items	Factor Loading
	Component 1
Gaining the support, avoiding penalties and ensuring legitimacy.	.869
Justifying internal activities and enhance relations with stakeholders groups.	.863
Improving image and maintaining reputation in the society.	.835
Avoiding fines and penalties, lessening risks and satisfying employees.	.839
Gaining license to operate, survive and achieve long-term sustainability.	.803
Eigenvalues	3.547
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.889
Bartlett's Test of Sphericity. Approx. Chi-Square	562.181
df	10
Sig.	.000
Percent of variance explained (%)	70.933

Table 4.14 shows that KMO and MSA for legitimacy considerations items had a value of .889, considered 'meritorious' and thus appropriate for conducting factor analysis. Furthermore, the BTS value was large (562.181), and the significance level was in



$p < .001$ . This means factor analysis could be conducted on items and was suitable for the legitimacy considerations variable. The results also demonstrate that there was one factor with an eigenvalue of greater than one based on latent root criterion. In addition, the results demonstrate that all the five items predicted to measure legitimacy considerations were formed on a single factor alone. All these items had a factor loading of more than 0.50, ranging from .803 to .869 and explained over 70 % of the variance. This indicates that these items correlate very significantly with the factor itself, and measured the legitimacy considerations as predicted.

#### 4.4.3.8 Factor Analysis of Stakeholders Pressures

Similarly, a factor analysis was also conducted for six items that measured stakeholders' pressures to find out whether they could be measured as a single variable. The test was conducted using the principal component analysis and the Varimax rotation with Kaiser Normalization. In order to test the suitability of factor analysis for stakeholders' pressures, KMO MSA and BTS were conducted. Eigenvalues and plot scree were used to support the extraction results. The results of these tests are shown in Table 4.15.

Table 4.15  
*Factor Analysis for Stakeholders Pressures*

Items	Factor Loading
	Component 1
Threatening the firm with sanctions.	.843
Providing rewards for the firm.	.891
Reminding the firm of its moral obligation.	.859
Promoting the firm.	.902
Claiming the firm provides monetary & nonmonetary information.	.904
Eigenvalues	3.874
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.850
Bartlett's Test of Sphericity. Approx. Chi-Square	802.432
df	10
Sig.	.000
Percent of variance explained (%)	77.481

The results in Table 4.15 illustrated that KMO and MSA for stakeholders' pressures items had a value of .850, considered 'meritorious' and thus appropriate for conducting factor analysis. Furthermore, the BTS value was large (802.432) and the significance level was in  $p < .001$ . This means factor analysis could be conducted on items and was suitable for stakeholders' pressures variable. The results of the test also demonstrate that there was one factor with an eigenvalue of greater than one based on latent root criterion, and five items used to measure stakeholders' pressures were loaded on a single factor alone. All five items had a factor loading of more than 0.50, ranging from .843 to .904, which explained over 77% of the total variance. This reveals that these items correlated very significantly with the factor itself, and confirms that five items of stakeholders' pressures measured the same variable as predicted.

#### **4.4.3.9 Factor Analysis of Perceived Importance of EMA**

Similar steps of factor analysis were also performed for all twelve items that measured the perceived importance of EMA to find out whether they could be measured as a single variable. KMO MSA and BTS were tested to determine whether the factor analysis was suitable for the perceived importance of EMA. Eigenvalues and plot scree were used to support the extraction results. The results are shown in Table 4.16.

Table 4.22 shows that KMO MSA for perceived importance of EMA items had a value of .940, considered 'meritorious' and consequently appropriate for conducting factor analysis. Furthermore, the BTS value was large (2296.078) and the significance level was in  $p < .001$ . The KMO MSA and BTS results clearly indicated that factor

analysis could be conducted on the items and suitable for perceived importance of the EMA variable.

Table 4.16  
*Factor Analysis for Perceived Importance of EMA*

Items	Factor Loading
	Component 1
Identification of environmental costs.	.785
Estimation of environmental liabilities.	.835
Classification of environmental costs.	.833
Allocation of environment-related costs to production processes.	.839
Allocation of environment-related costs to products.	.838
Introduction of improvement to environment-related costs management.	.856
Creation and use of environment-related costs accounts.	.871
Development and use of environmental key performance indicators (KPIs).	.838
Product life cycle cost assessments.	.795
Product inventory analyses.	.831
Product impact analyses.	.849
Product improvement analyses.	.813
Eigenvalues	8.310
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.940
Bartlett's Test of Sphericity. Approx. Chi-Square	2296.078
df	66
Sig.	.000
Percent of variance explained (%)	69.246

The results in Table 4.16 also demonstrate that all 12 items used to measure perceived importance of EMA were loaded on a single factor alone. All 12 items had a factor loading of more than 0.50, ranging from .785 to .871, which explained over 69% of the variance. This indicates that these items correlated very significantly with the factor itself with an eigenvalue of greater than one based on latent root criterion. Such results confirm that 12 items of perceived importance of EMA measured the same variable as predicted.

#### **4.4.3.10 Factor Analysis of Perceived Benefits of EMA**

Similarly, a factor analysis was also conducted for all 15 items that measured the perceived benefits of EMA to find out whether they could be measured as a single

variable. The values of KMO MSA, BTS, eigenvalues and factor loadings are tabulated in Table 4.17.

Table 4.17 below shows that KMO MSA for perceived benefits of EMA items had a value of .937 considered ‘meritorious’, according to *Hair et al.* (2010), and thus appropriate for doing factor analysis. Furthermore, the BTS value was very large (3787.348) and the significance level was in  $p < .001$ . This means that the perceived benefits of EMA items were suitable for factor analysis. Furthermore, all the 15 items used to measure perceived benefits of EMA were loaded onto a single factor alone with factor loading of more than 0.50, ranging from .827 to .897, which explained over 74% of the variance. The value of Eigenvalue was greater than one based on latent root criterion. Such results confirm that 15 items correlate very significantly with the factor itself, and measure the perceived benefits of EMA as predicted.

Table 4.17  
*Factor Analysis for Perceived Benefits of EMA*

Items	Factor Loading
	Component 1
Increased demand for green products.	.871
Increase in product margins.	.840
Increase in customer satisfaction.	.867
Cost of capital reduction.	.868
Insurance cost reduction.	.865
Operating cost reduction.	.841
Identification of new opportunities.	.855
Generation of process innovation.	.852
Generation of product innovation.	.860
Attraction of better quality staff.	.897
Improvement in productivity.	.893
Improvement in reputation.	.862
Improvement in decision making.	.877
Product costing improvement.	.827
Production process improvement.	.859
Eigenvalues	11.156
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.937
Bartlett's Test of Sphericity. Approx. Chi-Square	3787.348
df	105
Sig.	.000
Percent of variance explained (%)	74.374

#### 4.4.3.11 Factor Analysis of Intention to Adopt EMA

The result in Table 4.18 shows that KMO MSA for intention to adopt EMA items had a value of .939, considered ‘meritorious’ according to *Hair et al.* (2010). Furthermore, the BTS value was very large (2864.833) and the significance level was in  $p < .001$ . The KMO MSA and BTS values clearly indicated that factor analysis could be conducted and suitable for the intention to adopt EMA items.

Table 4.18 also shows that all 12 items predicted to measure the intention to adopt EMA were loaded on a single factor. All 12 items had a factor loading of more than .50, ranging from .809 to .902, which explained over 75% of the variance with an eigenvalue of greater than one based on latent root criterion. This indicates that these items correlated very significantly with the factor itself and measured the intention to adopt EMA as predicted. This indicates that these items correlated very significantly with the factor itself and measured the intention to adopt EMA as predicted.

Table 4.18  
*Factor Analysis for Intention to Adopt EMA*

Items	Factor Loading
	Component 1
Identification of environmental costs.	.878
Estimation of environmental liabilities.	.871
Classification of environmental costs.	.902
Allocation of environment-related costs to production processes.	.889
Allocation of environment-related costs to products.	.889
Introduction of improvement to environment-related costs management.	.890
Creation and use of environment-related costs accounts.	.864
Development and use of environmental key performance indicators (KPIs).	.855
Product life cycle cost assessments.	.809
Product inventory analyses.	.861
Product impact analyses.	.873
Product improvement analyses.	.858
Eigenvalues	9.089
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.939
Bartlett's Test of Sphericity. Approx. Chi-Square	2864.833
df	66
Sig.	.000
Percent of variance explained (%)	75.745

## 4.5 Descriptive Statistics

Descriptive analysis is the transformation of raw data into an organized form that lends the data to easy interpretation to provide descriptive information of populations. Most of the statistical information consists of data that are summarized and presented in a form that is easy for the reader to understand. This section presents the statistical techniques used to identify the characteristics of the variables in this sample. The results present a descriptive analysis for each variable based on mean, standard deviation, minimum and maximum for the total respondents in this study.

### 4.5.1 The Descriptive Statistics for Business Strategy (BS)

Table 4.19 shows the characteristic of business strategy in Libyan manufacturing firms. The results show that the mean scores for the two dimensions of business strategy were 3.37 and 3.49 respectively. The defender strategy had the highest mean (3.49) while prospector strategy had the lowest mean (3.37) with a maximum score of 5 and a minimum score of 2. The highest variability with a standard deviation of .838 was prospector strategy. These results imply that the participants are relatively more inclined towards defender strategy than prospector strategy.

Table 4.19  
*Overall Result of Descriptive Statistics on Business Strategy*

Variable	N	Mean	Std. Deviation	Minimum	Maximum
Prospector Strategy (PS).	202	3.37	.838	2	5
Defender Strategy (DS).	202	3.49	.730	2	5
Valid N (listwise)	202				

The results of the descriptive statistics for each of the items on business strategy dimensions are displayed in Table 4.20. The results show that the mean scores ranged

from 3.15 to 3.71, with a maximum score of 5 and a minimum score of 1. The tenth item, which was related to the defender dimension of business strategy, had the highest score (3.71) among all items. This item was related to the attempt of the firm to be ahead of competitors by focusing on improving existing products.

On the contrary, the lowest mean score was 3.15 for the sixth item related to the prospector dimension and concerned the attempt of firm to be ahead of competitors by adopting the latest technology regardless of costs. The highest variability with a standard deviation was 1.105 for the fifth and the sixth item related to prospector dimension as it concerned the attempt of firm to be ahead of competitors by responding rapidly to new ideas in the environment and adopting the latest technology regardless of costs.

Table 4.20  
*Results of Descriptive Statistics for Items on Business Strategy*

	<b>Item</b>	<b>Mean</b>	<b>Std. dev</b>	<b>Min</b>	<b>Max</b>
1	Ensuring quality products rather than price.	3.43	.976	2	5
2	Introducing new products ahead of others.	3.30	.909	2	5
3	Having a wider range of products available.	3.40	.899	2	5
4	Expanding into new markets.	3.55	.930	2	5
5	Responding rapidly to new ideas in the environment.	3.29	1.105	1	5
6	Adopting the latest technology regardless of costs.	3.15	1.105	1	5
7	Using flexible and multiple technologies.	3.48	.989	2	5
8	Maintaining a dynamical & flexible administrative system.	3.40	.937	2	5
9	Cheaper pricing of our products.	3.43	.913	2	5
10	Focusing on improving existing products.	3.71	.863	2	5
11	Concentrating on a more limited range of products.	3.45	.881	2	5
12	Focusing on an existing stable market.	3.55	.914	2	5
13	Moving cautiously on directly relevant changes in the environment.	3.44	.913	2	5
14	Maintaining the existing cost-efficient technology.	3.49	.953	2	5
15	Using a single core technology.	3.32	.941	2	5
16	Maintaining a stable & simple administrative system.	3.55	.957	2	5
Valid N (listwise)		202			

#### 4.5.2 The Descriptive Statistics for Nature of Formalization (NF)

The results of the descriptive statistics for each item on the nature of formalization variable are presented in Table 4.21. This variable consists of six items. The results showed the mean scores ranged from 3.07 to 3.45 with the maximum score of 5 and the minimum score of 1. The sixth item had the highest score (3.45) among all items. This was related to written rules and procedures guiding performance improvement efforts, while the lowest mean score was 3.07 for first item related to the written rules and procedures showing how the workers can make suggestions for changes. The highest variability with a standard deviation of 1.119 also was the first item.

Table 4.21  
*Results of Descriptive Statistics on Nature of Formalization*

	<b>Item</b>	<b>N</b>	<b>Mean</b>	<b>Std. dv</b>	<b>Min</b>	<b>Max</b>
1	Written rules and procedures showing how workers can make suggestions for changes.	202	3.07	1.119	1	5
2	Written rules and procedures describing how workers can make changes on their job.	202	3.10	1.085	1	5
3	Written rules and procedures showing how workers can experiment with their job.	202	3.24	1.020	1	5
4	Written rules and procedures guiding quality improvement efforts.	202	3.42	.928	2	5
5	Written rules and procedures guiding creative problem solving.	202	3.36	.921	2	5
6	Written rules and procedures guiding performance improvement efforts.	202	3.45	.941	2	5
Valid N (listwise)		202				

#### 4.5.3 The Descriptive Statistics for Organizational Culture (OC)

Table 4.22 shows the characteristics of the organizational culture in Libyan manufacturing firms. The results reveal the mean scores for the four dimensions of organizational culture, which ranged from 2.83 to 4.22. The hierarchy culture (HC) scored the highest mean (4.22), while adhocracy culture (AC) scored the lowest mean (2.83) with the maximum score of 5 and the minimum score of 1. The highest



variability with a standard deviation was 1.058 also for adhocracy culture (AC). These results imply that hierarchy is the more dominant culture within Libyan manufacturing firms than the clan, adhocracy or market cultures.

Table 4.22  
*Overall Result of Descriptive Statistics on Organizational Culture*

	<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
1	Clan	202	3.548	.907	2	5
2	Adhocracy	202	2.825	1.058	1	5
3	Market	202	3.554	.952	2	5
4	Hierarchy	202	4.217	.831	2	5
	Valid N (listwise)	202				

The results of the descriptive statistics for each item of organizational culture dimensions are presented in Table 4.23. The results of 24 items showed that the mean scores ranged from 2.78 to 4.32 with the maximum score of 5 and the minimum score of 1. The nineteenth item, which was related to the hierarchy dimension of organizational culture, had the highest score (4.32) among all items. This item suggests that the organization is a very controlled and structured place.

Formal procedures generally govern what people do. Conversely, the lowest mean score was 2.78 for the eighth item related to the adhocracy dimension as it was about leadership in an organization that is generally considered to exemplify the entrepreneurship, innovating, or risk taking characteristics. The highest variability with a standard deviation was 1.268 for the eleventh item related to the adhocracy dimension as it relates to an organization that emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.

Table 4.23  
*Results of Descriptive Statistics for Items on Organizational Culture*

	<b>Item</b>	<b>Mean</b>	<b>Std. dev</b>
1	The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.	3.60	.984
2	The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.	3.55	1.017
3	The management style in the organization considers teamwork, consensus, and participation.	3.55	.962
4	The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.	3.54	1.003
5	The organization emphasizes human development. High trust, openness, and participation persist.	3.55	.951
6	The organization defines success on the basis of the development of human resources, teamwork, employee commitment, & concern for people.	3.49	.994
7	The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.	2.80	1.120
8	The leadership in the organization is generally considered to exemplify entrepreneurship, innovating, or risk taking.	2.78	1.161
9	The management style in the organization considers individual risk-taking, innovation, freedom, and uniqueness.	2.86	1.176
10	The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.	2.83	1.168
11	The organization emphasizes acquiring new resources and creating new challenges. Trying new things & prospecting for opportunities are valued.	2.87	1.268
12	The organization defines success on the basis of having the most unique or newest products. It is a product leader and innovator.	2.81	1.223
13	The organization is very result oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.	3.62	1.087
14	The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.	3.57	1.040
15	The management style in the organization considers hard-driving competitiveness, high demands, and achievement.	3.76	1.071
16	The glue that holds the organization together is the emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes.	3.48	1.085
17	The organization emphasizes competitive actions and achievement. Hitting stretch targets & winning in the marketplace are dominant.	3.46	1.064
18	The organization defines success on the basis of the winning in the marketplace and outpacing the competition. Competitive market leadership is key.	3.43	1.140
19	The organization is a very controlled and structured place. Formal procedures generally govern what people do.	4.32	.778
20	The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.	4.31	.771
21	The management style in the organization considers security of employment, conformity, predictability, and stability in relationships.	4.14	.978
22	The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.	4.15	.973
23	The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.	4.12	.987
24	The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.	4.26	.848
	Valid N (listwise)	202	

#### 4.5.4 The Descriptive Statistics for Top Management Support (TMS)

The overall results of the descriptive statistics for each item on the top management support variable are shown in Table 4.24. This variable consists of six items, and the results show that the mean scores ranged from 3.36 to 3.40 with the maximum score of 5 and the minimum score of 2. The highest score of 3.40 was related to the first, second and fourth items, showing that top management was interested in EMA adoption, considered EMA practices important to the firm and effectively communicated its support for EMA.

Conversely, the lowest mean score 3.36 was related to both the third and fifth items (provided active support for EMA practices by top management and exercised its authority in support of EMA). The highest variability with a standard deviation of .947 was related to the third item (exercised its authority in support of EMA).

Table 4.24  
*Result of Descriptive Statistics on Top Management Support*

	<b>Item</b>	<b>N</b>	<b>Mean</b>	<b>Std. dev</b>	<b>Min</b>	<b>Max</b>
<b>1</b>	Interested in EMA adoption.	202	3.40	.926	2	5
<b>2</b>	Considered EMA important to firm.	202	3.40	.937	2	5
<b>3</b>	Exercised its authority in support EMA.	202	3.36	.947	2	5
<b>4</b>	Effectively communicated to its support for EMA.	202	3.40	.905	2	5
<b>5</b>	Provided adequate resources to support EMA adoption efforts.	202	3.36	.943	2	5
<b>6</b>	Provided active support for EMA.	202	3.37	.943	2	5
	Valid N (listwise)	202				

#### 4.5.5 The Descriptive Statistics for Coercive Pressures (CP)

The results of descriptive statistics for each item of coercive pressures are displayed below in Table 4.25. This variable consists of nine items, and the result showed that the mean scores ranged from 2.91 to 3.36 with the maximum score of 5 and the

minimum score of 1. The ninth item had the highest score (3.36), which was related to obliging the firm to adopt environmental techniques and practices.

Conversely, the lowest mean score was 2.91, related to the first item, which touched on the provision of effective initiatives by the government to encourage and support environmental and accounting practices. The highest variability with a standard deviation of (1.081) was in the third and seventh items. The third item was related to the provision of guidelines by the government regarding tracking and allocating environment costs and the seventh item asked about the firm's commitment to environmental legislations.

Table 4.25  
*Results of Descriptive Statistics on Coercive Pressures*

	<b>Item</b>	<b>N</b>	<b>Mean</b>	<b>Std. dev</b>	<b>Min</b>	<b>Max</b>
1	Provide effective initiatives to support environmental & accounting practices.	202	2.91	1.023	1	5
2	Provide guidelines to adopt EMA.	202	3.11	1.078	1	5
3	Provide guidelines related to track and allocate environment costs.	202	3.08	1.081	1	5
4	Provide educating and training programs for EMA adoption.	202	2.96	1.021	1	5
5	Provide financial incentives, subsidies and facilities for EMA adoption.	202	2.94	1.047	1	5
6	Require info on environmental activities & related costs in financial accounts.	202	3.08	1.076	1	5
7	Monitor firm's commitment to environmental legislation.	202	3.19	1.081	1	5
8	Impose strict penalties & fines if the firm violates environmental laws.	202	3.13	1.076	1	5
9	Oblige the firm to adopt environmental practices.	202	3.36	.899	2	5
Valid N (listwise)		202				

#### **4.5.6 The Descriptive Statistics for Normative Pressures (NP)**

The results of the descriptive statistics for each item of normative pressures are presented in Table 4.26. This variable consists of seven items, and the results showed that the mean scores ranged from 2.98 to 3.16 with the maximum score of 5, and the

minimum score of 1. The fourth item had the highest score (3.16) which asked about the role of professional bodies in providing suitable training and education on EMA, while the lowest mean score was 2.98 for the sixth item related to the provision of appropriate training courses on EMA by formal education institutions. The highest variability with a standard deviation of 1.081 related to the seventh item on effectively communicating with the firm to solve environmental problems.

Table 4.26  
*Result of Descriptive Statistics on Normative Pressures*

	<b>Item</b>	<b>N</b>	<b>Mean</b>	<b>Std. dev</b>	<b>Min</b>	<b>Max</b>
1	Motivating the adoption of environmental management and accounting practices.	202	3.11	1.080	1	5
2	Providing guidelines, principles and information for adoption of EMA.	202	3.13	1.048	1	5
3	Effective monitoring of firm's commitment to professional standards.	202	3.12	1.025	1	5
4	Providing suitable training & education on EMA by professional bodies.	202	3.16	.997	1	5
5	Providing adequate knowledge about EMA by formal education institutions.	202	3.14	1.005	1	5
6	Providing appropriate training courses on EMA by formal education institutions.	202	2.98	.997	1	4
7	Effectively communicating with the firm to solve environmental problems.	202	3.08	1.081	1	5
Valid N (listwise)		202				

#### **4.5.7 The Descriptive Statistics for Legitimacy Considerations (LC)**

The results of the descriptive statistics for each item on legitimacy considerations variable are presented in Table 4.27. This variable consists of five items, and the result showed that the mean scores ranged from 3.12 to 3.45 with the maximum score of 5 and the minimum score of 1. The third item had the highest score (3.45) among all items, which was related to improving image and maintaining reputation in the society. On the contrary, the lowest mean score was 3.12 for the second item related to the desire of firm to justify internal activities and enhance its relations with stakeholders. The second item had highest variability with .973 of standard deviation.

Table 4.27  
*Result of Descriptive Statistics on Legitimacy Considerations*

	<b>Item</b>	<b>N</b>	<b>Mean</b>	<b>Std. dev</b>	<b>Min</b>	<b>Max</b>
1	Gaining the support, avoiding penalties and ensuring legitimacy.	202	3.36	.903	2	5
2	Justifying internal activities and enhance relations with stakeholders groups.	202	3.12	.973	1	5
3	Improving image and maintaining reputation in the society.	202	3.45	.931	2	5
4	Avoiding fines and penalties, lessening risks and satisfying employees.	202	3.40	.872	2	5
5	Gaining license to operate, survive and achieve long-term sustainability.	202	3.17	.964	1	5
Valid N (listwise)		202				

#### 4.5.8 The Descriptive Statistics for Stakeholder Pressures (SP)

The results of descriptive statistics for each item on the stakeholder pressures variable are presented in Table 4.28. This variable consists of five items, and the results showed that the mean scores ranged from 2.88 to 3.18 with the maximum score of 5 and the minimum score of 1. The third item had the highest score (3.18), asking about reminding the firm of its moral obligation towards environment protection. Conversely, the first item had the lowest mean score (2.88), and it asked about threatening the firm with sanctions if it does not reduce environmental impacts. The highest variability with a standard deviation of 1.133 was also the third item.

Table 4.28  
*Results of Descriptive Statistics on Stakeholder Pressures*

	<b>Item</b>	<b>N</b>	<b>Mean</b>	<b>Std. dev</b>	<b>Min</b>	<b>Max</b>
1	Threatening the firm with sanctions.	202	2.88	1.086	1	5
2	Providing rewards for the firm.	202	2.89	1.111	1	5
3	Reminding the firm of its moral obligation.	202	3.18	1.133	1	5
4	Promoting the firm.	202	3.11	1.113	1	5
5	Claiming the firm provides monetary & nonmonetary information.	202	3.13	1.081	1	5
Valid N (listwise)		202				

#### 4.5.9 The Descriptive Statistics for Perceived Importance of EMA (PIEMA)

The results of the descriptive statistics for each item on the perceived importance of EMA variable are presented in Table 4.29. This variable consists of twelve items, and the results showed that the mean scores ranged from 3.43 to 3.60 with the maximum score of 5 and the minimum score of 2. Two items had the highest mean score (3.60) among all items. The first one was the tenth item, asking about product inventory analyses. The second was the eleventh item to product impact analyses.

On the contrary, the seventh item had the lowest mean score (3.43), and asked about the creation and use of environment-related costs accounts. The highest variability with a standard deviation of 1.089 was related to the eleventh item. These findings imply that the product inventory analyses and also product impact analyses are the most important items of EMA practices for participants, while the creation and use of environment-related costs accounts are the least important.

Table 4.29  
*Result of Descriptive Statistics on Perceived Importance of EMA*

	<b>Item</b>	<b>N</b>	<b>Mean</b>	<b>Std. dev</b>	<b>Min</b>	<b>Max</b>
1	Identification of environmental costs.	202	3.57	.991	2	5
2	Estimation of environmental liabilities.	202	3.58	.934	2	5
3	Classification of environmental costs.	202	3.44	1.021	2	5
4	Allocation of environment-related costs to production processes.	202	3.59	.985	2	5
5	Allocation of environment-related costs to products.	202	3.54	1.003	2	5
6	Introduction of improvement to environment-related costs management.	202	3.53	1.037	2	5
7	Creation and use of environment-related costs accounts.	202	3.43	1.021	2	5
8	Development and use of environmental key performance indicators (KPIs).	202	3.55	1.065	2	5
9	Product life cycle cost assessments.	202	3.56	1.007	2	5
10	Product inventory analyses.	202	3.60	1.075	2	5
11	Product impact analyses.	202	3.60	1.089	2	5
12	Product improvement analyses.	202	3.55	1.027	2	5
	Valid N (listwise)	202				

#### 4.5.10 The Descriptive Statistics for Perceived Benefits of EMA (PBEMA)

The results of the descriptive statistics for each item on the perceived benefits of EMA variable are presented in Table 4.30. This variable consists of fifteen items, and the results showed that the mean scores ranged from 3.48 to 3.77, with the maximum score of 5 and the minimum score of 2.

The twelfth item had the highest score (3.77) compared with other items, which was related to improvement in reputation. Conversely, the lowest mean score was 3.48 for the fourth item related to the cost of capital reduction. The highest variability with a standard deviation of .989 was related to the fifth item and asked about insurance cost reduction. These findings imply that improvement in reputation is the most important perceived benefits of EMA for participants, while the cost of capital reduction is the least important. Since all the items received high mean values, it can be concluded that Libyan firms perceive significant benefits that can be enjoyed by adopting EMA.

Table 4.30  
*Results of Descriptive Statistics on Perceived Benefits of EMA*

	Item	N	Mean	Std. dev	Min	Max
1	Increased demand for green products.	202	3.54	.952	2	5
2	Increase in product margins.	202	3.58	.955	2	5
3	Increase in customer satisfaction.	202	3.52	.988	2	5
4	Cost of capital reduction.	202	3.48	.983	2	5
5	Insurance cost reduction.	202	3.51	.989	2	5
6	Operating cost reduction.	202	3.58	.965	2	5
7	Identification of new opportunities.	202	3.49	.948	2	5
8	Generation of process innovation.	202	3.55	.962	2	5
9	Generation of product innovation.	202	3.55	.962	2	5
10	Attraction of better quality staff.	202	3.55	.987	2	5
11	Improvement in productivity.	202	3.56	.976	2	5
12	Improvement in reputation.	202	3.77	.909	3	5
13	Improvement in decision making.	202	3.65	.962	2	5
14	Product costing improvement.	202	3.67	.943	2	5
15	Production process improvement.	202	3.56	.945	2	5
Valid N (listwise)		202				



#### 4.5.11 The Descriptive Statistics for Intention to Adopt EMA (ITAEMA)

The results of descriptive statistics for each item of the intention to adopt the EMA variable are presented in Table 4.31. This variable consists of twelve items, and the results showed that the mean scores ranged from 3.26 to 3.50 with the maximum score of 5 and the minimum score of 1. The ninth item had a higher score (3.50) than the remaining items. The ninth item asked about the product life cycle cost assessments.

On the other hand, the lowest mean score was 3.26 for the sixth and eighth items. The sixth was the item related to the introduction of improvement to environment-related costs management, while the eighth item was related to the development and use of environment-related key performance indicators (KPIs). The highest variability with a standard deviation of 1.095 was also related to the eighth item. These results imply that the participants have the intention, or are more willing to adopt product life cycle cost assessments than the other EMA practices.

Table 4.31  
*Results of Descriptive Statistics on Intention to Adopt EMA*

	Item	N	Mean	Std. dev	Min	Max
1	Identification of environmental costs.	202	3.30	.947	2	5
2	Estimation of environmental liabilities.	202	3.31	.933	2	5
3	Classification of environmental costs.	202	3.35	.946	2	5
4	Allocation of environment-related costs to production processes.	202	3.38	1.001	2	5
5	Allocation of environment-related costs to products.	202	3.41	.953	2	5
6	Introduction of improvement to environment-related costs management.	202	3.26	1.068	1	5
7	Creation and use of environment-related costs accounts.	202	3.32	.961	2	5
8	Development and use of environmental key performance indicators (KPIs).	202	3.26	1.095	1	5
9	Product life cycle cost assessments.	202	3.50	1.004	2	5
10	Product inventory analyses.	202	3.42	.975	2	5
11	Product impact analyses.	202	3.41	1.000	2	5
12	Product improvement analyses.	202	3.39	.962	2	5
	Valid N (listwise)	202				

## 4.6 Correlation Analysis

According to Pallant (2007), correlation analysis is a technique used to describe the strength and direction of linear relationship between two variables, and correlation coefficients ( $r$ ) can take on only one value which ranges from  $-1$  to  $+1$ .

The size of the absolute value of the correlation provides an indication of the strength of the relationship among variables, irrespective of its sign, if it is positive or negative. The correlation value of  $1$  or  $-1$ , meaning that value of one variable can be determined exactly by knowing the value of other variables, whereas, the correlation value  $0$  indicates that there is no relationship between the specified two variables. Pallant (2007) provides guidelines to determine the strength of the relationship between two variables as demonstrated in Table 4.32.

Table 4.32  
*Pallant's Guidelines on Correlation Strength*

( $r$ ) value	Strength of relationship
$r = +/- 0.10$ to $+/- 0.29$	Small
$r = +/- 0.30$ to $+/- 0.49$	Medium
$r = +/- 0.50$ to $+/- 1.00$	Large

In the current study, correlation analysis was used to determine the strength and direction of the linear relationship between the main variables. Table 4.33 displays the results of the correlation analysis for all variables involved in the study.

Table 4.33

*The Correlation Analysis- All Variables*

		ITAEMA	PIEMA	PBEMA	TMS	PS	DS	NF	CC	AC	MC	HC	CP	NP	LC	SP
ITAEMA	Pearson Correlatio	1														
	Sig. (2-tailed)															
PIEMA	Pearson Correlatio	.768**	1													
	Sig. (2-tailed)	.000														
PBEMA	Pearson Correlatio	.752**	.726**	1												
	Sig. (2-tailed)	.000	.000													
TMS	Pearson Correlatio	.756**	.692**	.644**	1											
	Sig. (2-tailed)	.000	.000	.000												
PS	Pearson Correlatio	.711**	.643**	.664**	.649**	1										
	Sig. (2-tailed)	.000	.000	.000	.000											
DS	Pearson Correlatio	.658**	.612**	.574**	.559**	.540**	1									
	Sig. (2-tailed)	.000	.000	.000	.000	.000										
NF	Pearson Correlatio	.700**	.649**	.630**	.604**	.567**	.537**	1								
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000									
CC	Pearson Correlatio	.566**	.544**	.521**	.507**	.459**	.446**	.406**	1							
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000								
AC	Pearson Correlatio	.647**	.611**	.639**	.569**	.503**	.501**	.512**	.415**	1						
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000							
MC	Pearson Correlatio	.646**	.598**	.596**	.616**	.537**	.436**	.481**	.429**	.524**	1					
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000						
HC	Pearson Correlatio	-.594**	-.587**	-.552**	-.495**	-.464**	-.429**	-.449**	-.311**	-.469**	-.451**	1				
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000					
CP	Pearson Correlatio	.633**	.672**	.577**	.535**	.524**	.453**	.475**	.390**	.394**	.501**	-.426**	1			
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000				
NP	Pearson Correlatio	.726**	.715**	.632**	.715**	.622**	.559**	.619**	.475**	.578**	.531**	-.476**	.533**	1		
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000			
LC	Pearson Correlatio	.750**	.683**	.672**	.635**	.645**	.573**	.693**	.468**	.530**	.493**	-.523**	.527**	.672**	1	
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		
SP	Pearson Correlatio	.718**	.695**	.624**	.614**	.593**	.489**	.594**	.407**	.542**	.523**	-.496**	.574**	.622**	.650**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	

\*\* . Correlation is significant at the 0.01 level (2-tailed). a. Listwise N=202

The results as shown in Table 4.33 exhibit the relationships between the independent and dependent variables. In general, the results showed that there were significant and positive relationships between most of the variables at the 0.01 level. The results showed that the relationships were close, between all variables on the perceived benefits, perceived importance of EMA, top management support, prospector and defender business strategy, nature of formalization, clan, adhocracy, market and hierarchy culture, coercive pressure, normative pressure, legitimacy considerations and stakeholders pressure and the intention to adopt EMA (ITAEMA) ( $r = 0.566$  to  $r = 0.768$ ). All correlations were positive, except for the hierarchy culture, which had a negative correlation ( $r = -0.594$ ).

The mediating variables perceived benefits and perceived importance of EMA had a positive and significant correlation at the 0.01 level, with all the independent variables on top management support, prospector and defender business strategy, nature of formalization, clan, adhocracy, market and the hierarchy culture, coercive pressure, normative pressure, legitimacy considerations and stakeholders pressure ( $r = 0.521$  to  $r = 0.726$ ). All correlations were positive except for the hierarchy culture, which had a negative large correlation with perceived benefits and perceived importance of EMA respectively ( $r = -0.552$  and  $r = -0.587$ ).

#### **4.7 Regression Analysis**

Multiple regression analysis was used to examine the relationship between independent and dependent variables. According to Tabachnick and Fidell (2007), multiple regression tests were used to predict the score of the dependent variable from scores of several independent variables. In addition, multiple regression allows a more

sophisticated exploration of the interrelationships among a set of the variables examined (Pallant, 2007). In other words, correlations indicate the existence of relationships between variables, whereas the regression analyses specify the most crucial variables for these relationships. According to Hair *et al.* (2010), some requirements should be fulfilled before using the multiple regression analysis, namely the outliers, linearity, multicollinearity, homoscedasticity and normality.

#### **4.7.1 Outliers**

According to Pallant (2007), outliers can be checked from the scatter plot and standardized residual plot. The outliers can occur if the standardized residual is more than 3.3 or less than -3.3. In large samples, it is not unusual to find a number of outlying residuals. If there are only a few outliers, it might not be necessary to do any procedure (Pallant, 2007). Tabachnick and Fidell (2007) also state that the outliers can be evaluated by using a plot such as a box plots, histogram, normal probability plots or detrended normal probability plots. For this study, outliers were detected using box plots and 7 cases were found as outliers and were excluded from the data analysis. After excluding these outliers, the standardized residual for all variables involved in the regression was between -3.3 and 3.3. Hence, the problem of the outliers was resolved and should not be a violation for the data analysis.

#### **4.7.2 Linearity**

Linearity of variables depicts the relationship between the variables in a straight line (Tabachnick & Fidell, 2007). This assumption is evaluated by using an analysis of residual plots as proposed by (Hair *et al.*, 2010). The results of plot diagrams, as

portrayed in Figure 4.1, showed no evidence of nonlinear pattern to the residuals in the shape. Thus, the assumption of linearity was met to use the multiple regression analysis to predict the relationship between dependent and independent variables.

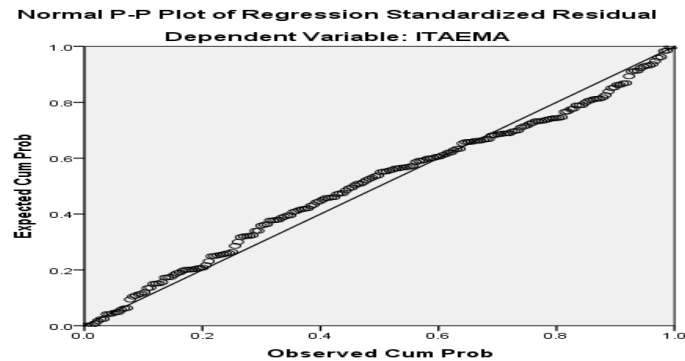


Figure 4.1  
*Linearity test for Intention to Adopt EMA*

#### **4.7.3 Multicollinearity**

Multicollinearity is another assumption should be checked to conduct the regression analysis. According to Hair *et al.* (2010) multicollinearity is the degree to which the other variables can explain a variable in the analysis. According to Tabachnick & Fidell (2007), multicollinearity problem appears when high correlations more of 0.90 exist between independent variables. This assumption can be tested using tolerance value and variance inflation factor (VIF) tests. Hair *et al.* (2010), define tolerance as the amount of variability of the selected independent variable not explained by the other independent variables, whereas VIF is the opposite of tolerance value.

In this study, the tolerance and VIF tests were used to investigate multicollinearity. The result showed that there was no multicollinearity between the variables as tolerance values were more than 0.10 and the VIF values were less than 10, as suggested by Hair

*et al.* (2010). The results of tolerance and VIF for all the variables will be illustrated later in the multiple regression analysis of each dimension.

#### 4.7.4 Homoscedasticity

Homoscedasticity occurs if the variance values of the dependent variable appear to concentrate on only a limited range of the independent variables according to Hair *et al.* (2010). This assumption can be made by examining the residual plot as it is satisfied if there is no pattern of increase or decrease of the residual. The results of homoscedasticity test as demonstrated in Figure 4.2 indicated that homoscedasticity assumption was met; hence the regression test could be used.

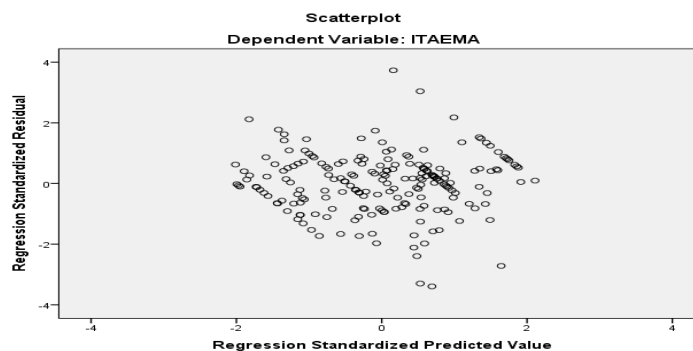


Figure 4.2  
*Homoscedasticity test on the Intention to Adopt EMA*

#### 4.7.5 Normality

Normality should be checked in order to use multiple regressions. This assumption is concerned about the data distribution, and can be examined through either statistical or graphical methods such as the skewness and Kurtosis values, histogram of residual plots or normal probability plot of the regression (Tabachnick & Fidell, 2007).

Normality exists when skewness and kurtosis ratios are  $\pm 2$  at the significance level of 0.05 (Hair *et al.*, 2010).

The results in Table 4.2 in the section on Screening and Cleaning of Data (p. 203) showed that all ratios of the skewness and Kurtosis were between the normal distribution  $\pm 2$ . Thus, the normality assumption was fulfilled. A histogram is another approach used to check the assumption of normality (Hair *et al.*, 2010). Figure 4.3 shows an example of the results of the histogram of residual plots and the rest are displayed in Appendix F. The results showed that the normality assumption was not violated, whereas distribution approximated to a normal curve, thus asserting normal distribution of data.

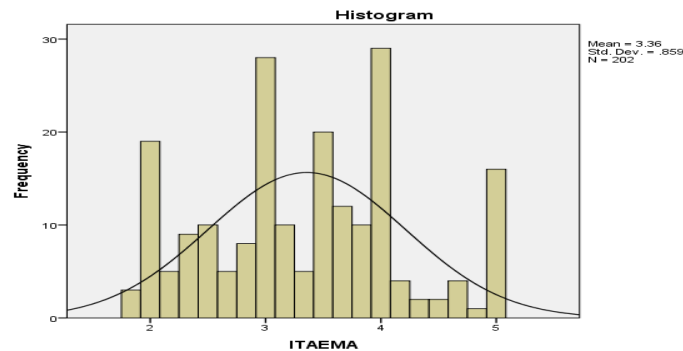


Figure 4.3  
*Normality test for Intention to Adopt EMA*

#### **4.8 Testing the Model Using Multiple Regression Analysis of the Variables that Influence the Intention to Adopt EMA**

A standard multiple regression is used to examine the relationship between independent variables which include two sets of organizational variables (business strategy, nature of formalization, organizational culture and top management support), and environmental variables (coercive pressures, normative pressures, legitimacy



considerations and stakeholder pressures) with the intention to adopt EMA as a dependent variable.

The researcher had to follow the same steps for testing the influence of both organizational and environmental variables on the adoption process of EMA by assessing the relationship between different independent variables and the intention to adopt EMA. Both perceived benefits and perceived importance of EMA were also assessed for their influence on the intention to adopt EMA and on their role as mediators for the independent variables in this study.

The results of the multiple regression analysis were used to predict the effect of the independent variables on the dependent variable and the strength of the relationship between them. The multiple regression analysis was carried out in this study and the detailed SPSS output is in Appendix G1 to G11.

#### **4.8.1 Evaluating the Influence of the Organizational Variables (Business Strategy, Nature of Formalization, Organizational Culture and Top Management Support) on the Intention to Adopt EMA**

The results of the multiple regression analysis between business strategy, the nature of formalization, organizational culture and top management support variables with the intention to adopt EMA in Libyan firms are displayed in Table 4.34, and Appendix G1. All independent and dependent variables were measured on a continuous scale.

The output as shown in the Appendix G1 indicated regression in this model was a very good fit (The adjusted  $R^2 = .775$ ), which means that this model explains 75.5% of the variance of the dependent variable. The results indicated that the overall model was

statistically significant ( $F= 87.395, p <.001$ ), and all predictor variables were statistically significant.

Table 4.34 shows that all independent variables contributed significantly to the model. The PS ( $b = 0.167, t = 3.442, sig. = 0.001$ ), as it explained 16.7% of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.073 and 0.269. The DS ( $b = 0.141, t = 3.160, sig. = 0.002$ ) as it explained 14.1% of the variance, the researcher is 95 % confident that actual value of B in the population of this study lies somewhere between 0.063 and 0.270.

The NF was ( $b = 0.193, t = 4.192, sig. = 0.000$ ) as it explained 19.3 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.100 and 0.279.

The Clan culture, ( $b = 0.112, t = 2.748, sig. = 0.007$ ) as it explained 11.2% of the variance, the researcher is 95 % confident that the actual value of B in population of this study lies somewhere between 0.030 and 0.182. The Adhocracy culture, ( $b = 0.114, t = 2.530, sig. = 0.012$ ) as it explained 11.4% of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.020 and 0.164. The Market culture, ( $b = 0.115, t = 2.528, sig. = 0.012$ ) as it explained 11.5% of the variance, the researcher is 95 % confident that actual value of B in the population of this study lies somewhere between 0.023 and 0.185.

The Hierarchy culture ( $b = - 0.134, t = - 3.239, sig. = 0.001$ ) as it explained 13.4 percent of the variance, the researcher is 95 % confident that the actual value of B in the

population of this study lies somewhere between - 0.223 and - 0.054. The TMS ( $b=0.193$ ,  $t = 3.605$ ,  $sig. = 0.000$ ) as it explained 19.3 percent of variance, the researcher is 95 per cent confident that the actual value of B in the population of this study lies somewhere between 0.087 and 0.298. The result also revealed that PS, DS, NF, Clan, Adhocracy, Market and TMS scores were positively related to the intention to adopt EMA practices (ITAEMA) in Libyan firms. As these variables increase, these firms are more likely or willing to adopt EMA. The hierarchy culture was negative, meaning that as this variable increases, the Libyan firms are less willing to adopt EMA.

Furthermore, Table 4.34 shows TMS and NF were the strongest contributing predictors to this relationship, which explained 19.3% of the variance for the each factor. The values of the tolerance and VIF demonstrated no multicollinearity between the variables as their values were less than 10 for the VIF and more than 0.10 for tolerance level as indicated by Hair *et al.* (2010).

Table 4.34  
*Results of Regression Model for Organizational Variables (Business Strategy, Nature of Formalization, Organizational Culture and Top Management Support) with the Intention to Adopt EMA*

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.506	.320		1.582	.115	-.125	1.137		
PS	.171	.050	.167	3.442	.001	.073	.269	.478	2.091
DS	.166	.053	.141	3.160	.002	.063	.270	.559	1.788
NF	.189	.045	.193	4.192	.000	.100	.279	.527	1.899
Clan	.106	.039	.112	2.748	.007	.030	.182	.674	1.483
Adhocracy	.092	.036	.114	2.530	.012	.020	.164	.555	1.803
Market	.104	.041	.115	2.528	.012	.023	.185	.541	1.849
Hierarchy	-.138	.043	-.134	-3.239	.001	-.223	-.054	.657	1.523
TMS	.193	.053	.193	3.605	.000	.087	.298	.391	2.560

Dependent Variable: ITAEMA

#### **4.8.2 Evaluating the Influence of the Environmental Variables (Coercive Pressures, Normative Pressures, Legitimacy Considerations and Stakeholder Pressures) on the Intention to Adopt EMA**

The results of multiple regression analysis between the coercive pressures, normative pressures, legitimacy considerations and stakeholder pressures and the intention to adopt EMA in the Libyan firms are displayed in Table 4.35 and in Appendix G2. All independent and dependent variables were measured on a continuous scale.

The output as shown in Appendix G2 indicated the regression in this model was a very good fit (The adjusted  $R^2 = .716$ ), which means that this model explains 71.6% of the variance of the dependent variable. The results also indicated that the overall model was statistically significant ( $F= 127.410$ ,  $p < 0.001$ ), and all predictor variables were statistically significant.

Table 4.35 shows that all four independent variables were highly significant to the model at the ( $p > 0.001$ ) level, with CP ( $b = 0.188$ ,  $t = 3.884$ ,  $sig. = 0.000$ ) as it explained 18.8 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.088 and 0.269.

The NP ( $b = 0.262$ ,  $t = 4.785$ ,  $sig. = 0.000$ ) as it explained 26.2 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.143 and 0.344. The LC is ( $b = 0.320$ ,  $t = 5.713$ ,  $sig. = 0.000$ ) as it explained 32 percent of variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.230 and 0.473. The SP, ( $b = 0.240$ ,  $t = 4.368$ ,  $sig. = 0.000$ ) as it explained 24 percent of the variance, the researcher is 95 % confident that the actual value of B in the population

of this study lies somewhere between 0.116 and 0.307. The result also reveals that CP, NP, LC, SP factors were positively related to the intention to adopt EMA practices (ITAEMA) in Libyan firms. As these variables increase, these firms are more likely or willing to adopt EMA.

Furthermore, Table 4.35 below showed LC was the strongest contributing predictor to this relationship, which explained 32% of the variance. The values of tolerance and VIF demonstrated no multicollinearity between the variables as their values were less than 10 for the VIF and more than 0.10 for tolerance level as indicated by Hair *et al.* (2010).

Table 4.35  
*Results of Regression Model for Environmental Variables (Coercive Pressures, Normative Pressures, Legitimacy Considerations and Stakeholder Pressures) with the Intention to Adopt EMA*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.248	.148		1.681	.094	-.043	.539		
CP	.178	.046	.188	3.884	.000	.088	.269	.607	1.647
NP	.244	.051	.262	4.785	.000	.143	.344	.472	2.119
LC	.351	.061	.320	5.713	.000	.230	.473	.451	2.216
SP	.212	.048	.240	4.368	.000	.116	.307	.470	2.126

Dependent Variable: ITAEMA

#### **4.8.3 Evaluating the Influence of the Organizational Variables (Business Strategy, Nature of Formalization, Organizational Culture and Top Management Support) on the Perceived Benefits and Perceived Importance of EMA**

Examining the regression organizational variables on the perceived benefits (PBEMA) and the perceived importance (PIEMA) was the next step for assessing the mediating role of PBEMA and PIEMA. The SPSS output as shown in Appendix G3 contains a standard multiple regression between eight independent variables and PBEMA as

dependent variable. This analysis was used to test the influence of business strategy, nature of formalization, organizational culture and top management support on PBEMA. The results showed that the overall model was statistically significant ( $F=46.846$ ,  $p < 0.001$ ) and (the adjusted  $R^2 = 0.646$ ), meaning that the model explained 64.6% of the variance of the PBEMA.

As can be seen from Table 4.36, six of independent variables had significant contribution to the model. The PS ( $b = 0.213$ ,  $t = 3.512$ ,  $sig. = 0.001$ ), as it explained 21.3 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.093 and 0.329. The NF is ( $b = 0.170$ ,  $t = 2.946$ ,  $sig. = 0.004$ ) as it explained 17 percent of the variance, the researcher is 95 % confident that actual value of B in the population of this study lies somewhere between 0.53 and 0.269.

The Clan culture, ( $b = 0.119$ ,  $t = 2.330$ ,  $sig. = 0.021$ ) as it explained 11.9% of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.017 and 0.201. The Adhocracy culture, ( $b = 0.207$ ,  $t = 3.682$ ,  $sig. = 0.000$ ), as it explained 20.7% of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.076 and 0.250.

The Market culture, ( $b = 0.121$ ,  $t = 2.113$ ,  $sig. = 0.036$ ) as it explained 12.1% of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.007 and 0.203.

The Hierarchy culture ( $b = -0.134$ ,  $t = -2.593$ ,  $sig. = 0.010$ ) as it explained 13.4 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between  $-0.236$  and  $-0.032$ . DS and TMS variables were not significant in this model. Table 4.36 also shows that PS, NF, Clan, Adhocracy and Market factors were positively related to PBEMA in Libyan firms, meaning that as these factors increase, the Libyan firms are more likely to perceive the benefits of EMA. The hierarchy culture was negative. This means that as the hierarchy culture increases, Libyan firms are less likely to perceive the benefits of EMA. Furthermore, the values of tolerance and VIF are within acceptable limits by Hair *et al.* (2010), meaning that no multicollinearity exists between the variables.

Table 4.36  
*Results of Regression Model for Organizational Variables (Business Strategy, Nature of Formalization, Organizational Culture and Top Management Support) with Perceived Benefits of EMA*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	1.239	.388		3.196	.002	.474	2.003		
PS	.211	.060	.213	3.512	.001	.093	.329	.478	2.091
DS	.089	.064	.078	1.396	.164	-.037	.215	.559	1.788
NF	.161	.055	.170	2.946	.004	.053	.269	.527	1.899
Clan	.109	.047	.119	2.330	.021	.017	.201	.674	1.483
Adhocracy	.163	.044	.207	3.682	.000	.076	.250	.555	1.803
Market	.105	.050	.121	2.113	.036	.007	.203	.541	1.849
Hierarchy	-.134	.052	-.134	2.593	.010	-.236	-.032	.657	1.523
TMS	.038	.065	.040	.591	.555	-.089	.166	.391	2.560

Dependent Variable: PBEMA

The SPSS output as shown in Appendix G4 contains a standard multiple regression between eight independent variables and PIEMA as the dependent variable. This analysis was used to test the influence of business strategy, nature of formalization, organizational culture top and management support on PIEMA. The results showed

that the overall model was statistically significant ( $F= 52.461$ ,  $p < 0.001$ ) and (the adjusted  $R^2 = 0.672$ ), meaning that the model explained 67.2% of the variance of the PIEMA.

Table 4.37 reveals that seven of independent variables had significant contribution to the model. The PS ( $b = 0.116$ ,  $t = 1.978$ ,  $sig. = 0.049$ ) as it explained 11.6 percent of the variance, the researcher is 95 % confident that actual value of B in the population of this study lies somewhere between (0.000 and 0.234). The DS ( $b = 0.128$ ,  $t = 2.373$ ,  $sig. = 0.019$ ) as it explained 12.8 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.025 and 0.273. The NF is ( $b = 0.179$ ,  $t = 3.210$ ,  $sig. = 0.002$ ), as it explained 17.9 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.067 and 0.280. The Clan culture, ( $b = 0.138$ ,  $t = 2.798$ ,  $sig. = 0.006$ ) as it explained 13.8% of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.038 and 0.220. The Adhocracy culture, ( $b = 0.118$ ,  $t = 2.177$ ,  $sig. = 0.031$ ) as it explained 11.8% of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.009 and 0.181. The Hierarchy culture ( $b = - 0.182$ ,  $t = - 3.643$ ,  $sig. = 0.000$ ) as it explained 18.2 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between - 0.286 and - 0.085. The Market culture was not significant in this model. The TMS ( $b = 0.148$ ,  $t = 2.297$ ,  $sig. = 0.023$ ) as it explained 14.8 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.021 and 0.272.



Table 4.37 also shows that PS, DS,NF, Clan, Adhocracy and TMS factors were positively related to PIEMA in the Libyan firms, meaning that as these factors increase, the Libyan firms are more likely to perceive the importance of EMA. The hierarchy culture was negative; this means that as the hierarchy culture increases, the Libyan firms are less likely to perceive the importance of EMA. Furthermore, the values of tolerance and VIF are within acceptable limits by Hair *et al.* (2010), meaning that no multicollinearity exists between the variables.

Table 4.37  
*Results of Regression Model for Organizational Variables (Business Strategy, Nature of Formalization, Organizational Culture and Top Management Support) with Perceived Importance of EMA*

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	1.307	.382		3.419	.001	.553	2.061		
PS	.117	.059	.116	1.978	.049	.000	.234	.478	2.091
DS	.149	.063	.128	2.373	.019	.025	.273	.559	1.788
NF	.173	.054	.179	3.210	.002	.067	.280	.527	1.899
Clan	.129	.046	.138	2.798	.006	.038	.220	.674	1.483
Adhocracy	.095	.044	.118	2.177	.031	.009	.181	.555	1.803
Market	.089	.049	.100	1.823	.070	-.007	.186	.541	1.849
Hierarchy	-.186	.051	-.182	-3.643	.000	-.286	-.085	.657	1.523
TMS	.147	.064	.148	2.297	.023	.021	.272	.391	2.560

Dependent Variable: PIEMA

#### **4.8.4 Evaluating the Influence of the Environmental Variables (Coercive Pressures, Normative Pressures, Legitimacy Considerations and Stakeholder Pressures) on Perceived Benefits and Perceived Importance of EMA**

The SPSS output, as shown in Appendix G5, contains the regression between four independent variables and PBEMA as the dependent variable. This analysis was used to test the influence of coercive pressures, normative pressures, legitimacy considerations and stakeholder pressures on PBEMA. The results showed that the overall model was

statistically significant ( $F= 64.402$ ,  $p < 0.001$ ) and ( $R^2 = 0.558$ ), meaning that the model explained 55.8% of the variance of the dependent variable.

Table 4.38 reveals that all four independent variables had significant contribution to the model. The CP is ( $b = 0.200$ ,  $t = 3.325$ ,  $sig. = 0.001$ ) as it explained 20 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.075 and 0.293. The NP, ( $b = 0.204$ ,  $t = 2.983$ ,  $sig. = 0.003$ ) as it explained 20.4 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.062 and 0.304. The LC, ( $b = 0.315$ ,  $t = 4.506$ ,  $sig. = 0.000$ ) as it explained 31.5% of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.188 and 0.480. The SP is ( $b = 0.178$ ,  $t = 2.600$ ,  $sig. = 0.010$ ) as it explained 17.8 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.037 and 0.267.

The result also revealed that CP, NP, LC, SP factors were positively related to PBEMA in the Libyan firms. As these variables increase, these firms are more likely to perceive EMA benefits. Furthermore, Table 4.38 showed LC was the strongest contributing predictor to this relationship, which explained over 31% of the variance. The values of tolerance and VIF were within acceptable limits by Hair *et al.* (2010), meaning that no multicollinearity exists between the variables.

Table 4.38

*Results of Regression Model for Environmental Variables (Coercive Pressures, Normative Pressures, Legitimacy Considerations and Stakeholder Pressures) with Perceived Benefits of EMA*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.874	.178		4.917	.000	.524	1.225		
CP	.184	.055	.200	3.325	.001	.075	.293	.607	1.647
NP	.183	.061	.204	2.983	.003	.062	.304	.472	2.119
LC	.334	.074	.315	4.506	.000	.188	.480	.451	2.216
SP	.152	.058	.178	2.600	.010	.037	.267	.470	2.126

Dependent Variable: PBEMA

The SPSS output, as shown in Appendix G6, contains the regression between four independent variables and PIEMA as the dependent variable. This analysis was used to test the influence of coercive pressures, normative pressures, legitimacy considerations and stakeholder pressures on PIEMA in the Libyan firms. The results showed that the overall model was statistically significant ( $F= 108.901$ ,  $p < 0.001$ ) and ( $R^2 = 0.682$ ), meaning that the model explained 68.2% of the variance of the dependent variable (PIEMA).

Table 4.39 reveals that all four independent variables contributed significantly to the model at the level ( $p < 0.001$ ). The CP is ( $b = 0.287$ ,  $t = 5.615$ ,  $sig. = 0.000$ ), as it explained 28.7 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.175 and 0.364. The NP, ( $b = 0.298$ ,  $t = 5.153$ ,  $sig. = 0.000$ ) as it explained 29.8 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.170 and 0.380.

The LC, ( $b = 0.186$ ,  $t = 3.137$ ,  $sig. = 0.002$ ) as it explained 18.6 percent of variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.075 and 0.329. The SP is ( $b = 0.224$ ,  $t = 3.869$ ,  $sig. = 0.000$ ) as it explained 22.4 percent of the variance, the researcher is 95 % confident that the actual value of B in the population lies somewhere between 0.096 and 0.296.

The result also revealed that CP, NP, LC, SP factors were positively related to PIEMA in Libyan firms. As these variables increase, these firms are more likely to perceive the importance of the EMA. Furthermore, Table 4.39 shows that NP was the strongest contributing predictor to this relationship, which explained about 30% of the variance. The values of the tolerance and VIF were within acceptable limits by Hair *et al.* (2010), meaning that no multicollinearity exists between the variables.

Table 4.39  
*Results of Regression Model for Environmental Variables (Coercive Pressures, Normative Pressures, Legitimacy Considerations and Stakeholder Pressures) with Perceived Importance of EMA*

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.600	.154		3.886	.000	.296	.905		
CP	.270	.048	.287	5.615	.000	.175	.364	.607	1.647
NP	.275	.053	.298	5.153	.000	.170	.380	.472	2.119
LC	.202	.064	.186	3.137	.002	.075	.329	.451	2.216
SP	.196	.051	.224	3.869	.000	.096	.296	.470	2.126

Dependent Variable: PIEMA

#### 4.8.5 Evaluating the Influence of Perceived Benefits and Perceived Importance of EMA on the Intention to Adopt EMA

A multiple regression analysis was conducted to assess the relationships between two mediating variables of the perceived benefits and perceived importance as

independent variables with the ITAEMA as the dependent variable. The results of multiple regression analysis between two variables - the perceived benefits and perceived importance and the intention to adopt EMA in the Libyan firms are displayed in Table 4.40, and Appendix G7. All variables were measured on a continuous scale.

Table 4.40  
*Results of Regression Model for Perceived Benefits and Perceived Importance of EMA with the Intention to Adopt EMA*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.153	.163		.935	.351	-.169	.475		
PBEMA	.426	.061	.412	6.959	.000	.305	.547	.473	2.112
PIEMA	.475	.060	.470	7.944	.000	.357	.592	.473	2.112

Dependent Variable: ITAEMA

The SPSS output, as shown in the Appendix G7, indicates that the regression in this model was a very good fit (the adjusted  $R^2 = .667$ ). This means that this model has explained 66.7% of the variance of the dependent variable. The results also indicate that overall the model was statistically significant ( $F = 202.550$ ,  $p < 0.001$ ). Furthermore, both predictor variables were statistically significant.

The results presented in Table 4.40 show that both mediating variables were significant in the model at the ( $p < 0.001$ ) level. Both two factors significantly influenced the intention to adopt EMA, with perceived benefits (PBEMA) ( $b = 0.412$ ,  $t = 6.959$ ,  $\text{Sig.} = 0.000$ ) as it explained 41.2 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.305 and 0.547. The perceived importance (PIEMA) ( $b = 0.470$ ,  $t = 7.944$ ,  $\text{Sig.} = 0.000$ ), as it

explained 47 percent of the variance, the researcher is 95 % confident that the actual value of B in the population of this study lies somewhere between 0.357 and 0.592.

The results from the model revealed that both PBEMA and PIEMA were positively related to ITAEMA in Libyan firms, meaning that as the PBEMA and PIEMA increase, these firms are more likely or willing to adopt EMA. Furthermore, Table 4.46 shows that PIEMA was the strongest contributing predictor to this relationship, which explained 47% of the variance. The results of tolerance and VIF values were within acceptable limits by Hair *et al.* (2010), meaning that no multicollinearity exists between the variables.

#### **4.8.6 Evaluating the Mediation Role of the Perceived Benefits and the Perceived Importance of EMA**

Evaluating the role of the mediating variables of the perceived benefits and the perceived importance on the intention to adopt EMA was conducted in four steps recommended by Baron and Kenny (1986). First, the researcher regressed the independent variables on the intention to adopt EMA as a dependent variable. Second, the researcher regressed the independent variables on the each mediating variable of the perceived benefits and perceived importance. Third, the researcher regressed the two mediating variables on the intention to adopt EMA.

Steps 1 to 3 were followed in the previous sections (see sections 4.7.1, 4.7.2, 4.7.3, 4.7.4, and 4.7.5), in compliance with the procedures of Baron and Kenny (1986). Fourth, the researcher regressed the independent and mediating variables on the intention to adopt EMA. In this study, the results of multiple regressions were

used to assess the indirect relationships to measure the mediating role of perceived benefits and perceived importance on intention to adopt EMA according to Baron and Kenny (1986).

To establish mediation three conditions must be fulfilled, according to the suggestion by Baron and Kenny (1986). The conditions are: (1) the independent variables must be significantly related to the dependent variable in the first equation; (2) the independent variables must be significantly related to mediator variables in the second equation; (3) the mediator should be significantly related to the dependent variables in the third equation.

If these requirements are all met, then the effect of the independent variables on dependent variable will be diminished when adding the mediator variables. Full mediation holds when the independent variables have no effect after mediator variables are introduced. However, if the effect of the independent variables on the dependent variable is still significant after adding the mediating variables, the effect will be considered as partial mediation, as suggested by Baron and Kenny (1986).

#### **4.8.7 The Mediating Effect of Perceived Benefits and Perceived Importance of EMA on the Relationship between Organizational Variables (Business Strategy, Nature of Formalization, Organizational Culture and Top Management Support) and the Intention to Adopt EMA**

Using the data from Tables 4.34, 4.36 and 4.40, the researcher calculated all possible mediation relationships of organizational variables and the intention to adopt EMA using the PBEMA as mediator. The results revealed that the relationships between the organizational variables (PS, DS, and NF; clan, adhocracy, market, hierarchy cultures,

and TMS) with ITAEMA were significant as explained earlier in Table 4.34. Thus, the first requirement according to Baron and Kenny (1986) was fulfilled.

The second step was the regression between organizational variables and PBEMA. From Table 4.36, the results indicated that the relationships of only six of organizational variables (PS, NF; clan, adhocracy, market and hierarchy cultures) were significant. The DS and TMS were not significant. Therefore, only six of independent variables (PS, NF; clan, adhocracy, market and hierarchy cultures) complied with the conditions set by Baron and Kenney (1986).

The third step was the regression between PBEMA and ITAEMA. The results from Table 4.40 indicated the relationship between PBEMA and ITAEMA was significant. Thus, the third condition set by Baron and Kenny (1986) was met, to test the mediation effect of perceived benefits (PBEMA) on the relationships of six organizational variables (PS, NF; clan, adhocracy, market and hierarchy cultures) with the intention to adopt EMA (ITAEMA). The results of multiple regression analysis equation testing the possible mediating effect (PBEMA) on the relationship between organizational variables and ITAEMA are tabulated in Table 4.41, with more details in Appendix G8.

Table 4.41 shows that model 1 explained 74.7 % of the variance in the dependent variable, and the model 2 explained 75.3% of the variance in intention to adopt EMA. The effect of PS, NF, clan, adhocracy, market and hierarchy cultures on ITEMA decreased upon the addition of PBEMA. As can be seen from Table 4.41, when PBEMA was controlled, the effect of six variables PS, NF; clan, adhocracy, market and hierarchy



on ITAEMA was still significant, but the beta coefficient for each variable decreased, than the earlier direct relationship of the independent and dependent variables as shown in model 1 and 2.

Table 4.41

*Results of Multiple Regression Model for Mediating Effect of Perceived Benefits of EMA on the Relationship between Organizational Variables (Prospector Strategy, Nature of Formalization, Clan, Adhocracy, Market and, Hierarchy Culture) and the Intention to Adopt EMA*

<b>Model</b>	<b>1</b>			<b>2</b>		
DV	ITAEMA					
Predictors	Coeff. (B)	Std. Error	Beta	Coeff. (B)	Std. Error	Beta
(Constant)	.969	.322		.747	.330	
PS	.250	.050	.244***	.213	.051	.208***
NF	.256	.046	.261***	.228	.047	.232***
Clan	.152	.040	.160***	.132	.040	.140***
Adhocracy	.131	.038	.162***	.104	.039	.128**
Market	.146	.042	.161***	.128	.042	.142**
Hierarchy	-.171	.045	-.165***	-.148	.045	-.143***
PBEMA				.154	.062	.149*
R <sup>2</sup>	.754			.762		
Adj. R <sup>2</sup>	.747			.753		
F	99.755			88.696		

\*\*\* Significant at the 0.001 level; \*\* significant at the 0.01 level; \*significant at the 0.05 level; +significant at the 0.10 level.

The prospector strategy decreased (PS) from  $b = 0.244$  to  $b = 0.208$ , nature of formalization (NF) from  $b = 0.261$  to  $b = 0.232$ , clan culture (CC) from  $b = 0.160$  to  $b = 0.140$ , adhocracy culture (AC) from  $b = 0.162$  to  $b = 0.128$ , market culture (MC) from  $b = 0.161$  to  $b = 0.142$ , and hierarchy culture (HC) from  $b = -0.165$  to  $b = -0.143$ . The decreased beta coefficient of PS, NF; clan, adhocracy, market and hierarchy variables indicates that they have an indirect influence on ITAEMA.

Thus, it could be interpreted that PBEMA partially mediate the relationship between these variables (PS, NF; clan, adhocracy, market and hierarchy) with ITAEMA. These findings imply that relationships between PS, NF; clan, adhocracy, market and hierarchy

variables with ITAEMA are mediated by how people perceive the benefits and of the EMA.

Using the data from Tables 4.34, 4.37 and 4.40, the researcher calculated all possible mediation relationships of organizational variables and the intention to adopt EMA using PIEMA as mediator. The results revealed that seven of independent variables (PS, DS, and NF; clan, adhocracy, hierarchy cultures, and TMS) complied with the conditions of Baron and Kenney (1986).

Table 4.40 demonstrated that the result from the multiple regression analysis that was conducted between PIEMA and ITAEMA was significant. Thus, the relationships between these variables were fit for the mediating test, according to the requirements of Baron and Kenny (1986).

The results of multiple regression analysis equation testing the possible mediating effect of PIEMA on the relationship between organizational variables (PS, DS, and NF; clan, adhocracy, hierarchy, and TMS) and ITAEMA are tabulated in Table 4.42, with more details in Appendix G9.

Table 4.42 shows that model 1 explained 76.8 % of the variance in the dependent variable, and model 2 explained 77.4% of the variance in intention to adopt EMA. The effect of PS, DS, and NF; clan, adhocracy, hierarchy and TMS variables on ITEMA decreased upon the addition of PIEMA.

Table 4.42

*Results of Multiple Regression Model for Mediating Effect of Perceived Importance of EMA on the Relationship between Organizational Variables (Prospector Strategy, Defender Strategy, Nature of Formalization, Clan, Adhocracy, Hierarchy Culture, and Top Management Support) and the Intention to Adopt EMA*

Model	1			2		
DV	ITAEMA					
Predictors	Coeff. (B)	Std. Error	Beta	Coeff. (B)	Std. Error	Beta
(Constant)	.663	.318		.463	.326	
PS	.187	.050	.183***	.169	.050	.165***
DS	.165	.053	.141**	.145	.054	.123**
NF	.195	.046	.199***	.171	.047	.174***
Clan	.116	.039	.122**	.097	.039	.102*
Adhocracy	.108	.036	.133**	.093	.037	.115*
Hierarchy	-.151	.043	-.146***	-.124	.044	-.120**
TMS	.227	.052	.228***	.203	.053	.203***
PIEMA				.139	.060	.137*
R <sup>2</sup>	.777			.783		
Adj. R <sup>2</sup>	.768			.774		
F	96.290			86.811		

\*\*\* Significant at the 0.001 level; \*\* significant at the 0.01 level; \*significant at the 0.05 level; +significant at the 0.10 level.

From Table 4.42, when PIEMA was controlled, the effect of PS, DS, and NF; clan, adhocracy, hierarchy and TMS variables on ITAEMA was still significant, but the beta coefficient for each variable was lower than the earlier direct relationship of the independent and dependent variables as shown in model 1 and 2. The prospector strategy (PS) decreased from  $b = 0.183$  to  $b = 0.165$ , defender strategy (DS) decreased from  $b = 0.141$  to  $b = 0.123$ , nature of formalization (NF) from  $b = 0.199$  to  $b = 0.174$ , clan culture (CC) from  $b = 0.122$  to  $b = 102$ , adhocracy culture (AC) from  $b = 0.133$  to  $b = 0.115$ , hierarchy culture (HC) from  $b = -0.146$  to  $b = -0.120$ , and top management support (TMS) decreased from  $b = 0.228$  to  $b = 0.203$ . The decreased beta coefficient of PS, DS, and NF; clan, adhocracy, hierarchy and TMS variables indicates that they have an indirect influence on ITAEMA. Thus, the results show that there is partial mediation effect of perceived importance of EMA (PIEMA) on the relationship between selected organizational variables and ITAEMA. These findings imply that relationships between

PS, DS, and NF; clan, adhocracy, hierarchy and TMS with ITAEMA are mediated by how people perceive the importance of EMA.

#### **4.8.8 The Mediating Effect of Perceived Benefits and Perceived Importance of EMA on the Relationship between Environmental Variables (Coercive Pressures, Normative Pressures, Legitimacy Considerations and Stakeholder Pressures) and the Intention to Adopt EMA**

Using the data from Tables 4.35, 4.38 and 4.40, the researcher calculated all possible mediation relationships of environmental variables and the intention to adopt EMA using PBEMA as mediator. The results revealed that four of independent variables (CP, NP, LC, and SP) complied with the conditions of Baron and Kenney (1986). The relationships of these variables were significantly related to the dependent variable (ITAEMA), as well as, they were significantly related to the mediating variable PBEMA.

Table 4.40 displays the results from multiple regression analysis that was conducted, showing that the relationship between PBEMA and ITAEMA was significant. Thus, the relationships between these variables were fit for mediating test, according to the requirements of Baron and Kenny (1986). The results of multiple regression analysis equation testing the possible mediating effect of the PBEMA on the relationship between the organizational variables (CP, NP, LC, and SP) and the ITAEMA are tabulated in Table 4.43, with more details in Appendix G10.

Table 4.43 shows that model 1 explained 71.6% of the variance in the dependent variable, and model 2 explained 74.5% of the variance in intention to adopt EMA. The effect of CP, NP, LC, and SP variables on ITEMA decreased upon the addition of PBEMA.

Table 4.43

*Results of Multiple Regression Model for Mediating Effect of Perceived Benefits of EMA on the Relationship between Environmental Variables (Coercive Pressures, Normative Pressures, Legitimacy Considerations and Stakeholder Pressures) and the Intention to Adopt EMA*

Model	1			2		
	ITAEMA			ITAEMA		
DV	Coeff. (B)	Std. Error	Beta	Coeff. (B)	Std. Error	Beta
Predictors						
(Constant)	.248	.148		.010	.148	
CP	.178	.046	.188***	.128	.045	.135**
NP	.244	.051	.262***	.194	.049	.208***
LC	.351	.061	.320***	.260	.061	.237***
SP	.212	.048	.240***	.170	.047	.193***
PBEMA				.272	.056	.263***
R <sup>2</sup>	.721			.751		
Adj. R <sup>2</sup>	.716			.745		
F	127.410			118.350		

\*\*\* Significant at the 0.001 level; \*\* significant at the 0.01 level; \*significant at the 0.05 level; +significant at the 0.10 level.

As can be seen from Table 4.43, when PBEMA was controlled, the effect of CP, NP, LC, and SP variables on ITAEMA was still significant, but the beta coefficient for each variable was lower than the earlier direct relationship of the independent and dependent variables as displayed in models 1 and 2. The coercive pressures (CP) decreased from  $b = 0.188$  to  $b = 0.135$ , normative pressures (NP) decreased from  $b = 0.262$  to  $b = 0.208$ , legitimacy considerations (LC) decreased from  $b = 0.320$  to  $b = 0.237$ , stakeholders pressures (SP) from  $b = 0.240$  to  $b = 0.193$ . The decreased beta coefficient of CP, NP, LC, and SP variables indicates that they have an indirect influence on ITAEMA.

Thus, the results suggest that there is partial mediation effect of perceived importance of EMA (PBEMA) on the relationship between environmental variables and ITAEMA. These findings imply that relationships between CP, NP, LC, and SP with ITAEMA are mediated by how people perceive the benefits of the EMA.

Using the data from Tables 4.35, 4.39 and 4.40, the researcher calculated all possible mediation relationships of environmental variables and the intention to adopt EMA using PIEMA as mediator. The results revealed that four of independent variables (CP, NP, LC, and SP) complied with the conditions of Baron and Kenney (1986). The relationships of these variables were significantly related to the dependent variable (ITAEMA), and, they were significantly related to the mediating variable (PIEMA). Table 4.40 demonstrated the results from the multiple regression analysis that was conducted between PIEMA and ITAEMA was significant. Thus, the relationships between these variables were fit for the mediating test. The results of multiple regression analysis equation testing the possible mediating effect of PIEMA on the relationship between organizational variables (CP, NP, LC, and SP) and ITAEMA are presented in Table 4.44, with more details in Appendix G11.

Table 4.44

*Results of Multiple Regression Model for Mediating Effect of Perceived Importance of EMA on the Relationship between Environmental Variables (Coercive pressures, Normative pressures, Legitimacy considerations and Stakeholder pressures) and Intention to Adopt EMA*

Model	1			2		
	ITAEMA			ITAEMA		
Predictors	Coeff. (B)	Std. Error	Beta	Coeff. (B)	Std. Error	Beta
(Constant)	.248	.148		.112	.149	
CP	.178	.046	.188***	.117	.048	.123*
NP	.244	.051	.262***	.182	.053	.195***
LC	.351	.061	.320***	.306	.061	.278***
SP	.212	.048	.240***	.167	.049	.189***
PIEMA				.227	.066	.225***
R <sup>2</sup>	.721			.737		
Adj. R <sup>2</sup>	.716			.730		
F	127.410			109.802		

\*\*\* Significant at the 0.001 level; \*\* significant at the 0.01 level; \*significant at the 0.05 level; +significant at the 0.10 level.

Table 4.44 shows that model 1 explained 71.6% of the variance in the dependent variable, and the model 2 explained 73% of the variance in intention to adopt EMA. The

effect of CP, NP, LC, and SP variables on ITEMA decreased upon the addition of PIEMA. Evident in Table 4.44, when PIEMA was controlled, the effect of CP, NP, LC, and SP variables on ITAEMA was still significant, but the beta coefficient for each variable was lower than the earlier direct relationship of the independent and dependent variables as displayed in model 1 and 2.

The coercive pressures (CP) decreased from  $b = 0.188$  to  $b = 0.123$ , normative pressures (NP) decreased from  $b = 0.262$  to  $b = 0.195$ , legitimacy considerations (LC) decreased from  $b = 0.320$  to  $b = 0.278$ , stakeholders pressures (SP) from  $b = 0.240$  to  $b = 0.189$ . The decreased beta coefficient of CP, NP, LC, and SP variables indicates that they have an indirect influence on ITAEMA. Also, these variables alone contributed 72.1% of the variance in the relationship but adding PIEMA would increase the variance to 73.7%.

Thus, the results suggest that there is partial mediation effect of perceived importance of EMA (PIEMA) on the relationship between environmental variables and ITAEMA. These findings imply that relationships between CP, NP, LC, and SP with ITAEMA are mediated by how people perceive the importance of the EMA.

#### **4.9 Test of Hypotheses**

This section displays and summarizes the results of the main hypothesis testing building on the regression analyses that were performed between different variables.

##### **Hypothesis H1: Business strategy type will have a significant direct influence on intention to adopt EMA practices**

Hypothesis H1 and its sub-hypotheses (H1.1, and H1.2) postulated a significant and direct relationship between two dimensions of business strategy and intention to adopt EMA practices.

**Hypothesis H1.1: Firms dominated by prospector strategy will have a positive significant direct influence on intention to adopt EMA practices.**

The results in the Table 4.34 reveal that the prospector strategy (PS) was positively and significantly related to intention to adopt EMA practices (ITAEMA) in the Libyan firms (Beta value = 0.167,  $t = 3.442$ , sig. = 0.001). In addition, the B value = 0.171 which indicated that for each unit increase in the prospector strategy, there is an expected increase of 0.171 in the intention to adopt EMA. This indicates that, as prospector strategy increases, the Libyan firms are more likely or willing to adopt EMA. Therefore, hypothesis H1.1 is supported.

**Hypothesis H1.2: Firms dominated by defender strategy will have a negative significant direct influence on intention to adopt EMA practices.**

Although, the results show that defender strategy (DS) was significantly associated with ITAEMA in the Libyan firms, it was surprising that the relationship was found to be positive (Beta value = 0.141,  $t = 3.160$ , sig. = 0.002). In addition, it is observed that for each unit increase in the defender strategy, there is an expected increase of 0.166 in the intention to adopt EMA. This indicates that, defender strategy positively contributed to increase the willingness of firms in adopt EMA. Therefore, hypothesis H1.2 is not supported. In summary, it can be concluded that hypothesis H1 is partially supported.

**Hypothesis H1a: The influence of business strategy type on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.**

Hypothesis H1a and its sub-hypotheses (H1a.1, and H1a.2) postulated significant and indirect relationships between two business strategy types (prospector and defender) and intention to adopt EMA practices through the effect of perceived benefits and



perceived importance of EMA. The two sub-hypotheses H1a.1 and H1a.2 displayed as following

**Hypothesis H1a.1: The influence of prospector strategy on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.**

From Table 4.41 and 4.42, the results demonstrate that the effect of prospector strategy on ITEMA decreased upon the addition of PBEMA, Beta value decreased from 0.244 to 0.208, and, when introducing PIEMA, Beta value decreased from 0.183 to 0.165. This indicates that prospector strategy has an indirect influence on ITAEMA. Thus, it could be interpreted that PBEMA as well as PIEMA mediates the relationship between prospector strategy and ITAEMA. In summary, these findings imply that the relationship between prospector strategy and ITAEMA is mediated by how people perceive the benefits and importance of the EMA. Therefore, the hypothesis H1a.1 is supported.

**Hypothesis H1a.2: The influence of defender strategy on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.**

From Table 4.41 and 4.42, the results demonstrate that the effect of defender strategy on ITEMA only decreased upon the addition of PIEMA, Beta value decreased from 0.141 to 0.123, but not when adding PBEMA. This indicates that defender strategy has an indirect influence on ITAEMA. Thus, it could be interpreted that PIEMA mediates the relationship between defender strategy and ITAEMA. These findings imply that the relationship between defender strategy and ITAEMA is mediated by how people perceive the importance of the EMA but not by perceiving the benefits. Hence, hypothesis H1a.2 is partially supported, and hypothesis H1a is partially supported.

**Hypothesis H2: Nature of formalization will have a positive significant direct influence on intention to adopt EMA practices.**

The Hypothesis H2 postulated a significant and direct relationship between the nature of formalization and intention to adopt EMA practices. The results in Table 4.34 reveal a positive and significant relationship between nature of formalization (NF) and intention to adopt EMA practices (Beta value = 0.193,  $t = 4.192$ , sig. = 0.000). Furthermore, the B value = 0.189 which indicated that for each unit increase in nature of formalization, there is an expected increase of 0.189 in the intention to adopt EMA. This means that the nature of formalization positively contributed to increases the willingness of Libyan firms in adopting EMA. Therefore, hypothesis H2 is supported.

**Hypothesis H2a: The influence of nature of formalization on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.**

Table 4.41 and 4.42 demonstrate that the effect of nature of formalization on ITEMA decreased upon the addition of PBEMA, Beta value decreased from 0.261 to 0.232, as well as, when introducing PIEMA, Beta value decreased from 0.199 to 0.174. This indicates that nature of formalization has an indirect influence on ITAEMA. Thus, it could be interpreted that PBEMA as well as PIEMA mediates the relationship between nature of formalization and ITAEMA. In summary, these findings imply that nature of formalization and ITAEMA are mediated by how people perceive the benefits and importance of the EMA. Therefore, hypothesis H2a is supported.

**Hypothesis H3: Organizational culture type will have a significant direct influence on intention to adopt EMA practices.**

Hypothesis H3 and its sub-hypotheses (H3.1, H3.2, H3.3, and H3.4) postulated a significant and direct relationship between four dimensions of the organizational culture (clan, adhocracy, market and hierarchy) and the intention to adopt EMA

practices. Three sub-hypotheses H3.1, H3.2 and H3.3 respectively postulated a significant and positive relationship between clan, adhocracy and market cultures and ITAEMA, while hypothesis H3.4 predicts that there is a significant and negative relationship between hierarchy culture and ITAEMA.

**Hypothesis H3.1: Firms dominated by clan culture will have a positive significant direct influence on intention and adoption of EMA practices.**

The results in Table 4.34 indicate that clan culture was positively and significantly related to intention to adopt EMA practices in the Libyan firms (Beta value = 0.112,  $t = 2.748$ , sig. = 0.007). It can be seen that for each unit increase in the clan culture, there is an expected increase of 0.106 in the intention to adopt EMA (B value = 0.106). In other words, as clan culture increases, the Libyan firms are more willing to adopt EMA. Thus, hypothesis H3.1 is supported.

**Hypothesis H3.2: Firms dominated by adhocracy culture will have a positive significant direct influence on intention and adoption of EMA practices.**

The results in Table 4.34 indicate that adhocracy culture was positively and significantly related to intention to adopt EMA practices in the Libyan firms (Beta value = 0.114,  $t = 2.530$ , sig. = 0.012). It appeared that for each unit increase in adhocracy culture there is an expected increase of 0.092 in the intention to adopt EMA (B value = 0.092). This result means that the adhocracy culture positively contributed to increases the Libyan firms' intention to adopt EMA. Therefore, hypothesis H3.2 is supported.

**Hypothesis H3.3: Firms dominated by market culture will have a positive significant direct influence on intention and adoption of EMA practices.**

The results of market culture in Table 4.34 found that (Beta value = 0.115,  $t = 2.528$ , sig. = 0.012). This indicated that a significant relationship between market culture and

the intention to adopt EMA. In addition, B value = 0.104 which indicated that for each unit increase in market culture there is an expected increase of 0.104 in the intention to adopt EMA. Thus, as market culture increases, Libyan firms are more willing to adopt EMA. Therefore, hypothesis H3.3 is supported.

**Hypothesis H3.4: Firms dominated by hierarchy culture will have a negative significant direct influence on intention and adoption of EMA practices.**

The results also reveal that there is a negative and significant relationship between the hierarchy culture and the intention to adopt EMA practices (Beta value = - 0.134,  $t = -3.239$ , sig. = 0.001). However, B value = -0.138, which indicates that for each unit increase in hierarchy culture there is an expected decrease of 0.138 in the intention to adopt EMA. Such result means that as hierarchy culture increases, the Libyan firms are less likely to adopt EMA. Thus, hypothesis H3.4 is supported. According to that, it can be concluded that hypothesis H3 is supported.

**Hypothesis H3a: The influence of organizational culture type on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.**

Hypothesis H3a and its sub-hypotheses (H3a.1, H3a.2, H3a.3, and H3a.4) postulated a significant and indirect relationship between four dimensions of organizational culture (clan, adhocracy, market and hierarchy) and intention to adopt EMA through the effect of perceived benefits and perceived importance of EMA. The four sub-hypotheses H3a.1, H3a.2, H3a.3, and H3a.4 respectively are displayed as following

**Hypothesis H3a.1: The influence of clan culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.**

The results in Table 4.41 and 4.42, demonstrate that the effect of clan culture on ITEMA decreased upon the addition of PBEMA, Beta value decreased from 0.160 to 140, as

well as, when introducing PIEMA, Beta value decreased from 0.122 to 0.102. This indicates that clan culture has an indirect influence on ITAEMA. Thus, it could be interpreted that PBEMA as well as PIEMA mediates the relationship between clan culture and ITAEMA. In summary, these findings imply that relationship clan culture and ITAEMA are mediated by how people perceive the benefits and importance of the EMA. Therefore, hypothesis H3a.1 is supported.

**Hypothesis H3a.2: The influence of adhocracy culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.**

The results presented in Table 4.41 and 4.42 demonstrate that the effect of adhocracy culture on ITEMA decreased upon the addition of PBEMA, Beta value decreased from 0.162 to 0.128, as well as, when introducing PIEMA, Beta value decreased from 0.133 to 0.115. This indicates that adhocracy culture has an indirect influence on ITAEMA. Thus, it could be interpreted that PBEMA as well as PIEMA mediates the relationship between adhocracy culture and ITAEMA. These findings imply that relationship adhocracy culture and ITAEMA are mediated by how people perceive the benefits and importance of the EMA. Therefore, hypothesis H3a.2 is supported.

**Hypothesis H3a.3: The influence of market culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.**

The results in Table 4.41 and 4.42 show that the effect of market culture on ITEMA decreased only upon the introducing of the PBEMA, Beta value decreased from 0.161 to 0.142, but not when adding PIEMA. This indicates that market culture has an indirect influence on the ITAEMA. Thus, it could be interpreted that PBEMA mediates the relation between market culture and ITAEMA. These findings imply that relationship

market culture and ITAEMA are mediated by how people perceive the benefits of the EMA but not by perceived importance of EMA. Therefore, hypothesis H3a.3 is partially supported.

**Hypothesis H3a.4: The influence of hierarchy culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.**

Although the results from Table 4.41 and 4.42 showed that the effect of hierarchy culture on ITEMA decreased upon the addition of the PBEMA, Beta value decreased from - 0.165 to - 0.143, as well as, when adding PIEMA, Beta value decreased from - 0.146 to - 0.120, the results showed that the relationship was still negative. Therefore hypothesis H1a.4 is rejected, but hypothesis H3a is partially supported.

**Hypothesis H4: Greater top management support will have a significant positive direct influence on intention and adoption of EMA practices.**

Hypothesis H4 postulated a significant direct relationship between the top management support and the intention to adopt EMA practices. The results in Table 4.34 show that the relationship between top management support (TMS) and intention to adopt EMA practices was positive and significant (Beta value = 0.193,  $t = 3.605$ , sig. = 0.000). It can be seen that for each unit increase in the top management support, there is an expected increase of 0.193 in the intention to adopt EMA (B value = 0.193). This result implies that as the top management support increases, the Libyan firms are more likely or willing to adopt EMA. Hence, hypothesis H4 is supported.

**Hypothesis H4a: The influence of top management support on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.**

The results in Table 4.41 and 4.42 demonstrate that the effect of top management support on ITEMA only decreased upon the addition of PIEMA, Beta value decreased from 0.228 to 0.203, but not when adding PBEMA. This indicates that top management support has an indirect influence on ITAEMA. Thus, it could be interpreted that PIEMA mediates the relationship between top management support and ITAEMA. These findings imply that relationship between top management support and ITAEMA is mediated by how people perceive the importance of the EMA but not by perceiving the benefits of the EMA. Hence, hypothesis H4a is partially supported.

**Hypothesis H5: Greater coercive pressures will have a significant positive direct influence on intention and adoption of EMA practices.**

Hypothesis H5 postulated a significant direct relationship between coercive pressures and the intention to adopt EMA practices. The results in Table 4.35 reveal a positive and significant relationship between coercive pressures (CP) and the intention to adopt EMA practices (Beta value = 0.188,  $t = 3.884$ , sig. = 0.000). In addition, B value = 0.178 which indicated that for each unit increase in coercive pressures there is an expected increase of 0.178 in the intention to adopt EMA. This result suggests that as the coercive pressures increases, the Libyan firms are more likely to adopt EMA. Hence, H5 is supported.

**Hypothesis H5a: The influence of coercive pressures on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.**

The results in Tables 4.43 and 4.44 demonstrate that the effect of coercive pressures on ITEMA decreased upon the addition of PBEMA, Beta value decreased from 0.188 to 0.135, as well as, when introducing PIEMA, Beta value decreased from 0.188 to 0.123. This indicates that coercive pressures have an indirect influence on ITAEMA. Thus, it

could be interpreted that PBEMA as well as PIEMA mediates the relationship between coercive pressures and ITAEMA. These findings imply that coercive pressures and ITAEMA are mediated by how people perceive the benefits and importance of the EMA. Therefore, hypothesis H5a is supported.

**Hypothesis H6: Greater normative pressures will have a significant positive direct influence on intention and adoption of EMA practices.**

Hypothesis H6 postulated a significant and direct relationship between normative pressures and intention to adopt EMA practices. The results in Table 4.35 show that the relationship between normative pressures (NP) and intention to adopt EMA practices was positive and significant (Beta value = 0.262,  $t = 4.785$ , sig. = 0.000). Moreover, B value = 0.244, which indicates that for each unit increase in normative pressures there is an expected increase of 0.244 in the intention to adopt EMA. Thus, as the normative pressures increases, the Libyan firms are more willingness to adopt EMA. Hence, hypothesis H6 is supported.

**Hypothesis H6a: The influence of normative pressures on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.**

The results in Table 4.43 and 4.44 demonstrate that the effect of normative pressures on ITEMA decreased upon the addition of PBEMA, Beta value decreased from 0.262 to 0.208, as well as, when introducing PIEMA, Beta value decreased from 0.262 to 0.195. This indicates that normative pressures have an indirect influence on ITAEMA. Thus, it could be interpreted that PBEMA as well as PIEMA mediates the relationship between normative pressures and ITAEMA. These findings imply that relationship normative pressures and ITAEMA are mediated by how people perceive the benefits and importance of the EMA. Therefore, hypothesis H6a is supported.



**Hypothesis H7: Legitimacy considerations will have a significant positive direct influence on intention and adoption of EMA practices.**

Hypothesis H7 postulated a significant and direct relationship between the legitimacy considerations and intention to adopt EMA practices. The results in Table 4.35 showed that the relationship between legitimacy considerations (LC) and intention to adopt EMA practices was positive and significant (Beta value = 0.320,  $t = 5.713$ , sig. = 0.000). The value of B is equal to 0.351, which indicated that for each unit increase in legitimacy considerations there is an expected increase of to 0.351 in the intention to adopt EMA. This result implies that legitimacy considerations positively contributed to increases the Libyan firms' intention to adopt EMA. Hence, it can be concluded that hypothesis H7 is supported.

**Hypothesis H7a: The influence of legitimacy considerations on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.**

The results in Table 4.43 and 4.44 demonstrate that the effect of the legitimacy considerations on the ITEMA decreased upon the addition of PBEMA, Beta value decreased from 0.320 to 0.237, as well as, when introducing PIEMA, Beta value decreased from 0.320 to 0.278. This indicates that the legitimacy considerations have an indirect influence on ITAEMA. Thus, it could be interpreted that the PBEMA as well as PIEMA mediates the relationship between legitimacy considerations and ITAEMA. This implies that relationship legitimacy considerations and ITAEMA are mediated by how people perceive the benefits and importance of the EMA. Therefore, hypothesis H7a is supported.

**Hypothesis H8: Greater stakeholder pressures will have a significant positive direct influence on intention and adoption of EMA practices.**

Hypothesis H8 postulated a significant and direct relationship between the stakeholder pressures and intention to adopt EMA practices. The results in Table 4.35 show that the relationship between stakeholder pressures (SP) and intention to adopt EMA practices was positive and significant (Beta value = 0.240,  $t = 4.368$ , sig. = 0.000). Since B value = 0.212, it can be concluded that for each unit increase in the stakeholder pressures, there is an expected increase of 0.212 in the intention to adopt EMA. This result implies that as the stakeholder pressures increases, the Libyan firms are more likely or willing to adopt EMA. Hence, hypothesis H8 is supported.

**Hypothesis H8a: The influence of stakeholder pressures on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.**

The results presented in Tables 4.43 and 4.44, demonstrate that the effect of stakeholder pressures on ITEMA decreased upon the addition of PBEMA Beta value decreased from 0.240 to 0.193, as well as, when introducing PIEMA Beta value decreased from 0.240 to 0.189. This indicates that stakeholder pressures have an indirect influence on ITAEMA. Thus, it could be interpreted that PBEMA as well as PIEMA mediates the relationship between stakeholder pressures and ITAEMA. These findings imply that relationship stakeholder pressures and ITAEMA is mediated by how people perceive the benefits and importance of the EMA. Therefore, hypothesis H8a is supported.

#### **4.10 Summary of Hypotheses**

The results of the testing of the hypotheses related to the relationships between independent and dependent variables, and mediation role of PBEMA and PIEMA are summarized in Table 4.45.

Table 4.45  
*Summary of Hypotheses*

<b>Hypotheses</b>		<b>Results</b>
H1	Business strategy type will have a significant direct influence on intention to adopt EMA practices.	Partially Supported
H1.1	Firms dominated by prospector strategy will have a positive significant direct influence on intention to adopt EMA practices.	Supported
H1.2	Firms dominated by defender strategy will have a significant negative direct influence on intention to adopt EMA practices.	Not Supported
H1a	The influence of business strategy type on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.	Partially Supported
H1a.1	The influence of prospector strategy on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.	Supported
H1a.2	The influence of defender strategy on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.	Partially Supported
H2	Nature of formalization will have a positive significant direct influence on intention to adopt EMA practices.	Supported
H2a	The influence of nature of formalization on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.	Supported
H3	Organizational culture type will have a significant direct influence on intention to adopt EMA practices.	Supported
H3.1	Firms dominated by clan culture type will have a positive significant direct influence on intention and adoption of EMA practices.	Supported
H3.2	Firms dominated by adhocracy culture type will have a positive significant direct influence on intention and adoption of EMA practices.	Supported
H3.3	Firms dominated by market culture type will have a positive significant direct influence on intention and adoption of EMA practices.	Supported
H3.4	Firms dominated by hierarchy culture type will have a negative significant direct influence on intention and adoption of EMA practices.	Supported
H3a	The influence of organizational culture type on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.	Partially Supported
H3a.1	The influence of clan culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.	Supported
H3a.2	The influence of adhocracy culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.	Supported
H3a.3	The influence of market culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.	Partially Supported
H3a.4	The influence of hierarchy culture on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits and perceived importance.	Not Supported
H4	Greater top management support will have a significant positive direct influence on intention and adoption of EMA practices.	Supported
H4a	The influence of top management support on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.	Partially Supported
H5	Greater coercive pressures will have a significant positive direct influence on intention and adoption of EMA practices.	Supported
H5a	The influence of coercive pressures on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.	Supported

Table 4.45 (Continued)

	Hypotheses	Results
H6	Greater normative pressures will have a significant positive direct influence on intention and adoption of EMA practices.	Supported
H6a	The influence of normative pressures on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.	Supported
H7	Legitimacy considerations will have a positive significant direct influence on intention and adoption of EMA practices.	Supported
H7a	The influence of legitimacy considerations on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.	Supported
H8	Greater stakeholder pressures will have a significant positive direct influence on intention and adoption of EMA practices.	Supported
H8a	The influence of stakeholder pressures on intention to adopt EMA practices will be positive and significant, but mediated by perceived benefits, and perceived importance.	Supported

#### 4.11 Chapter Summary

This chapter has displayed the statistical analyses for this study. The presentation of the findings of the study began with a description of the respondents' profile and then organizational culture profile, followed by the factor analysis. Eight (8) major hypotheses were tested in this study. Most of the hypotheses were fully or partially supported. The main findings of the study are discussed in further detail in terms of its theoretical and practical implications in the next chapter.

## **CHAPTER FIVE**

### **DISCUSSION AND CONCLUSION**

#### **5.1 Introduction**

This chapter summarizes and discusses the results from the data analysis presented in Chapter Four. The explanation of the main findings is based on previous literature. The main findings discussed in terms of its theoretical and practical implications, followed by a discussion of limitations and recommendations for future research.

#### **5.2 Recapitulation of the Findings of the Study**

The main purpose of this study was to examine the influence of the organizational and environmental variables on the intention to adopt EMA among Libyan firms that have not yet adopted the EMA technique. Subsequently, the influence of perceived benefits and perceived importance of EMA as mediators on the relationship between independent variables and intention to adopt EMA was also described and explained in this study.

#### **5.3 Discussion**

This section discusses the results of the data analysis extracted from Chapter Four in terms of existing knowledge and contribution in furthering the understanding in the EMA area. The results for each hypothesis are presented separately after highlighting the results of the descriptive analysis of the survey.

### 5.3.1 Descriptive Statistics

As mentioned earlier in Chapter Four, a comprehensive survey, using a questionnaire was used to collect data from selected financial directors and environmental managers in Libyan firms, who comprised the population of this study. A total of 202 usable questionnaires from a total of 324 questionnaires were distributed to the respondents and the response rate was 62.3 %.

The survey statistics showed that more than 87 % were males and about 13 % were females. In addition, the demographic data indicate that more than 60% of respondents involved in decision-making in Libyan firms were above 40 years old, and more than 24% were above 50 years. Moreover, they practiced and preferred the hierarchical organizational culture type, which emphasizes internal focus and integration while maintaining stability and control, and they would be less enthusiastic to adopt EMA, and in turn this would impact negatively on the adoption process. This implies that decision makers in Libyan firms are older and less enthusiastic about the adoption of EMA.

This is in line with earlier findings (Buchholtz & Ribbens, 1994; Hambrick & Mason, 1984; Twati, 2007; Young *et al.*, 2001), that the older generations are usually less enthusiastic about new practices and are less flexible in adopting innovations or new techniques and practices than the younger generations. For instance, Young *et al.* (2001) found that older managers were less flexible from a cognitive perspective in accepting or adapting to new ideas and practices.

Furthermore, older managers also have much invested, financially and emotionally in the organizational position quo and thus are unwilling to conduct changes. Thus, the

older people who practice hierarchy culture in the Libyan firms tend to view EMA techniques negatively and resist adopting EMA practices in these firms.

In addition, the present study found that more than 71% of the financial directors and environmental managers had university qualifications in the form of Bachelor's degrees, and less than 16% of them had postgraduate degrees and less than 13% had high school qualifications. Even though the majority of respondents had reasonable educational qualifications in accounting and management, there was still non-adoption of EMA, possibly due to lack of knowledge of EMA among participants. Hence, they would be less likely to perceive the benefits of EMA and its importance. This is in line with previous literature such as Twati (2007) who found that decision-makers who had lower technology education and lower education negatively influenced the adoption of management information systems within firms. Therefore, older managers without EMA education, who practice hierarchy culture in firms, negatively influence the adoption of EMA practices and were resistant to the adoption of EMA practices in Libyan firms.

The findings also showed that 49% of the respondents in Libyan manufacturing firms had been in their positions for more than ten years, implying that they would be less willing and enthusiastic to adopt EMA. Previous studies (Boeker, 1997; Buchholtz & Ribbens, 1994; Damanpour & Schneider, 2006; Young *et al.*, 2001) indicated that long tenure of the managers would lead to resistance in the adoption of innovations and organizational practices; where they are more likely to maintain the status quo. For example, Boeker (1997) claimed that such managers were less willing to make changes. According to Damanpour and Schneider (2006), longer tenure in the position

and in the management would inhibit the adoption of innovation, since managers often show sensitivity to information related to their work responsibilities, and are less receptive to adopting innovations. Thus, older managers, with long tenure, working in a hierarchy culture would be less receptive and less likely to adopt EMA in Libyan firms, as they are not convinced about the adoption and use of EMA and have not yet perceived its benefits and importance.

#### **5.4 Discussion on the Findings of Direct and Indirect Relationships among Variables**

This section discusses the findings of the data analysis for 28 hypotheses, which proposed to link the variables of this study. The discussion will first focus on the direct relationship between organizational and intention to adopt EMA and hypotheses related. The second section considered a discussion of hypotheses, which related the direct relationship between environmental variables and intention to adopt EMA. Following this, the indirect relationship related to the hypotheses and the mediating role of two variables (perceived benefits and perceived importance of EMA) on the intention to adopt EMA have discussed. The influence of each variable was assessed independently to determine which variable had the most influence on the intention to adopt EMA. There has been limited research on the EMA adoption issue especially in firms in developing countries, particularly in Libya. This study focused on Libya, a developing country, to address the lack of attention given to the EMA adoption issue by using the work done by Ferreira et al. (2010) on the EMA to measure the intention to adopt EMA.



### **5.4.1 Organizational Variables and Intention to Adopt EMA**

This section discusses the findings on the relationships between organizational variables and intention to adopt EMA that were uncovered by the present study. Based on TOE framework, contingency theory and prior literature related to the adoption of innovations and EMA, four main independent organizational variables with related dimensions were selected and assumed to be the most suitable for analyzing the EMA adoption process in the oil and manufacturing sectors in Libya. These independent variables were business strategy, nature of formalization, organizational culture and top management support.

#### **5.4.1.1 Business Strategy and Intention to Adopt EMA (H1)**

The findings of this research showed that strategy type pursued by the Libyan firms was the defender with a mean of 3.49 followed by the prospector strategy with a mean of 3.37. These findings imply that Libyan firms in both industry sectors prefer the defender strategy to the prospector strategy. In terms of correlations, the association between both types of business strategy (prospector and defender) with firms' intention to adopt EMA was highly significant; more so for the prospector strategy than the defender strategy. This indicates that firms employing the prospector strategy tend to be more willing to adopt EMA practices than those pursuing the defender strategy.

The results showed that the two types had a significant relationship with the intention to adopt EMA, prospector strategy ( $b = 0.167, p < .001$ ) defender strategy ( $b = 0.141, p < .001$ ). The prospector strategy exerted the stronger influence with a magnitude of .167 on the firms' intention to adopt EMA, compared with the defender strategy with

a magnitude of .141. Thus, it is predicted that Libyan firms following the prospector strategy are more inclined to adopt EMA. This result supports the assumption provided by Miles and Snow (1978) who proposed that the defender organizations will be less likely to adopt innovations, including their structures and many modifications, than the prospector organizations. Such results can be justified by the contingency theory that stresses efficiency as a reason to adopt new techniques by firms, which would lead to eventually improve corporate performance (Abrahamson, 1991, 1996). Firms might adopt EMA to improve performance and efficiency (Chang, 2007; Rikhardsson *et al.*, 2005). In this regard, researchers found that some EMA techniques were adopted in the United States due to their contribution to attaining cost savings, providing measurable advantages, or are considered more economically efficient (Chang, 2007; Gray & Bebbington, 2001). These findings also are consistent with TOE framework (Tornatzky & Fleischer, 1990) that assumes the organizational factors significantly impact on adoption process of innovation and new techniques.

Moreover, these findings are in line with the suggestions in prior literature (Ferreira *et al.*, 2008; Gosselin, 1997; Gurd *et al.*, 2002; Tabak & Barr, 1999), which claimed that business strategy type can enhance the adoption of innovations and new practices. For example, Ferreira *et al.* (2010) suggested that business strategy type was the more important factor in promoting the adoption of innovations such as EMA. This is confirmed by Gosselin (1997) who observed that business strategy type followed by corporations was an important factor to adopt activity management, and he found that firms with a prospector strategy tended to adopt innovations in the accounting field more frequently than those following the defender strategy. Abernethy and Guthrie (1994) also argue that information systems were found to be more effective in firms

employing the prospector strategy than in the firms which were employing the defender strategy, as seen through the design, adoption and implementation of management information systems.

With regard to defender strategy, it hypothesized to have a negative significant influence on the intention to adopt EMA, however, the study found a significant but positive relationship between defender strategy and the intention to adopt EMA. Therefore this hypothesis is not supported. Such result can be justified by the fact that the critical motivation for adopting EMA is the perceived benefits and the perceived importance associated with this technique, which might lead to enhanced intention of Libyan firms to adopt EMA even among those adopting the defender strategy. The present study has provided evidence to show that the Libyan firms are influenced by perceived benefits and perceived importance of EMA. Additionally, the result supports the idea that firms might adopt environmental practices as a response to pressures exerted by the external parties more than the organizational factors (Kamande, 2011). This study has found that the intention to adopt EMA in Libyan industrial firms is strongly impacted by environmental factors such as government regulations and environmental legislations.

The above discussion confirms that the prospector strategy type plays a decisive role in encouraging firms to adopt EMA. The regression analysis supported the hypothesis that the prospector strategy has a significant positive relationship with the firms' intention to adopt EMA. The results showed that the defender strategy was the dominant strategy in Libyan firms, which may impede the acceptance, adoption and use of EMA in Libyan firms. In other words, firms with the defender strategy are less

likely to perceive the benefits and importance of EMA, and thus are less willing to adopt EMA practices than those with the prospector strategy. Therefore, this study suggests that Libyan firms should employ prospector strategy to help them to adopt EMA practices.

#### **5.4.1.2 Nature of Formalization and Intention to Adopt EMA (H2)**

The results showed that in the Libyan firms, the nature of formalization was moderate; (Mean =3.27). For example, the result showed a moderate attitude toward written rules and procedures which guide performance improvement efforts (Mean=3.45), and low orientation to written rules and procedures that show how workers can make suggestions for changes of costs (Mean = 3.07). In terms of correlations, the association between nature of formalization and firms' intention firms to adopt EMA was highly significant.

The nature of formalization was hypothesized to have a positive significant influence on firms' intentions to adopt EMA. The findings supported the pre assumption ( $b = 0.193, p < .001$ ). Thus, it is predicted that nature of formalization in the organizations is effectively reflected through their behaviour toward the adoption of EMA. This finding implies that when the work rules and procedures in firms are more flexible, firms will be more willing to adopt EMA practices.

This result is consistent with the TOE framework (Tornatzky & Fleischer, 1990) that assumes that organizational characteristics such as the nature of formalization can constrain or facilitate the adoption and implementation of innovations and new practices. Additionally, this result supports the idea that organizational structures and

processes might influence the organization's behaviour towards the adoption of new techniques (Chau & Tam, 1997). Moreover, the result is consistent with the suggestion (Christ & Burritt, 2013) that EMA adoption and implementation are more likely to be successful when the structure of an organisation supports the exchange of ideas and inter-functional communication.

This finding is in line with the earlier findings such as that of Nahm *et al.* (2003), who found that organic structures had procedures and rules that promoted creativity, autonomous labour and learning, while mechanistic structures had procedures and rules that deprived workers of such opportunities. In addition, they found that firms that encourage creativity and autonomous labour and learning tend to decentralize decision-making, practice flexibility, and facilitate communication. Therefore, the intention and readiness of firms to adopt EMA are likely to be higher within the firms that have the rules and procedures that encourage and support creativity, autonomous labour and learning. In the other words, whenever firms have rules and procedures that encourage their workers to be creative, and engage in autonomous labour and learning, the intention to adopt EMA practices will be greater, meaning that the adoption process of EMA is impacted by the nature of formalization.

From the above results, it is clear that the nature of formalization will play an important role in the adoption process of EMA. The regression analysis supported the hypothesis that the nature of formalization has a significant positive relationship with the firms' intention to adopt EMA. In addition, the results of the current study provide support for the claim that flexible work rules would enhance firms' intention to adopt EMA. Hence, this study recommends that Libyan firms improve rules and work

procedures to encourage their employees to engage more in the decision-making process. This would facilitate the adoption of modern management information systems and new practices, including EMA, and allow the firms to reap the benefits. In other words, firms with a high level of the flexibility in rules and procedures in the workplace are more likely to perceive the benefits and the importance of EMA, and thus, are more willing to adopt EMA practices than those that are not.

#### **5.4.1.3 Organizational Culture and Intention to Adopt EMA (H3)**

The findings of this research showed that the Libyan firms were characterized by hierarchy culture type (Mean=4.217) followed by market culture (Mean=3.554) and clan culture (Mean=3.548), while adhocracy culture type was ranked the least favored (Mean =2.825). These findings show that dominant organizational culture type in both industries studied was hierarchy. In terms of the correlations, the association between the three types of organizational culture (clan, adhocracy and market) and firms' intention to adopt EMA was positive and highly significant, and the association with the hierarchy culture was negative.

The findings supported the hypotheses that assumed there are significant positive relationships existed between three types of culture organizational (clan, adhocracy and market) and the intention to adopt EMA, with  $b = 0.112$ ,  $p < .001$  for clan,  $b = 0.114$ ,  $p < .001$  for adhocracy, and  $b = 0.115$ ,  $p < .001$  for market; in contrast the hypothesis that assumed there is a significant negative relationship between the hierarchy organizational culture and the intention to adopt EMA is supported with  $b = - 0.134$ ,  $p < .001$ . Thus, this implies a high degree of clan, adhocracy or market cultures, will positively and effectively influence firms' intention to adopt EMA

practices, while firms with a high degree of hierarchy culture will negatively influence firms' willingness to adopt EMA practices, implying that the EMA adoption process is influenced by the dominant organizational culture type. Such results are consistent with the TOE framework (Tornatzky & Fleischer, 1990) that proposes that the characteristics of an organization, for example, a dominant organizational culture type might influence an organization to adopt innovations and new techniques.

Additionally, these findings are consistent with the findings of previous studies (Cameron & Quinn, 1999; Trivellas & Dargenidou, 2009; Twati, 2007), showing that clan culture, adhocracy, market cultures were correlated positively with adopters and users of innovation and new practices. For instance, Twati (2007) revealed that there was a positive relationship between these types of organizational culture and adoption of management information systems. The clan and adhocracy culture type are characterized by flexibility and positively related to a climate of trust, and a positive feeling toward the organization (Trivellas & Dargenidou, 2009). Dellana and Hauser (1999) found that adhocracy and clan culture types were significantly associated with total quality management success. Adhocracy culture emphasizes values such as innovativeness, adaptation, creativity, experimentation and entrepreneurship in discovering new markets and directions for growth, conducive for facilitating EMA adoption. In addition, market culture stresses core values such as productivity, efficiency, profitability and competitiveness, and it focuses on external orientation, stability and control. The literature indicates that both types of organizational culture - adhocracy and market - strongly support adopters and users of innovations and new practices (Cameron & Quinn, 1999; Twati, 2007).

From the above discussion, it is clear that increasing clan, adhocracy or market organizational culture types will facilitate the adoption of EMA among Libyan firms; and vice versa for firms practicing hierarchy culture. This study found out that hierarchy organizational culture dominated in both sectors, where EMA was not adopted. This is consistent with the findings of previous studies (Shokshok *et al.*, 2010; Twati, 2007). For example, Twati (2007) found that a dominant hierarchical culture was one of the main reasons that impeded the adoption of management information systems in Libyan organizations. Dependability, reliability, measurement, standardization, employment security, and centralization of decision-making are predominant values in this culture (Trivellas & Dargenidou, 2009).

Most of the Libyan firms in both industries are characterized by hierarchy culture, where information is kept highly confidential and the majority of the employees in the firm do not have the right to use this information without approval from upper management. Information is not shared among employees in different management levels. Firms concentrate on internal orientation, standardizations, stability and control, efficiency, certainty and formalized structures. Thus, a vast majority of Libyan firms in both sectors are not enthusiastic about EMA practices.

In addition, employees practicing hierarchical culture may discourage the adoption of EMA practices due to inflexibility in these firms. Rules, procedures and responsibilities in Libyan firms are well respected and firms resist any changes that might affect the structure and hierarchy of these firms. Therefore, it is not surprising that such practices and attitudes negatively affect the adoption of EMA in Libyan firms. Furthermore, most of the firms, due to fear of security of their information, do not share information. For their own survival, employees in these firms do not share



innovations and new practices, and some are not at the awareness stage of diffusion of the innovation theory (Twati, 2007). Therefore, firms will miss out on the tremendous benefits of EMA practices.

It is clear that firms with hierarchy culture will impede the adoption of EMA. In other words, firms practicing hierarchical culture are less likely to perceive the benefits and importance of EMA, and thus are less inclined to adopt EMA practices than those that are not. This may provide important explanations for non- adoption of EMA in Libya to date.

#### **5.4.1.4 Top Management Support and Intention to Adopt EMA (H4)**

The results showed that the Libyan firms had moderate top management support (Mean =3.38). In terms of correlations, the association between the top management support and the intention of Libyan firms to adopt EMA was positive, and highly significant. The findings of this study supported the hypothesis that there is a significant positive relationship existed between top management support and intention to adopt EMA ( $b= 0.193, p< .001$ ). Therefore, whenever the firms enjoy a greater degree of top management support, the firms will be more willing to adopt EMA practices, implying that the adoption of EMA is affected by top management support. This result is consistent with earlier findings (Damanpour & Schneider, 2006; Elenkov *et al.*, 2005) that top executives influenced job satisfaction and motivation of employees, and that they were largely responsible for creating a suitable organizational climate to promote and enhance the adoption of innovations and changes in an organization.

This finding is also compatible with the findings of other researchers (Baird *et al.*, 2007; Buchholtz & Ribbens, 1994; Chang, 2007; Chang & Deegan, 2010; Damanpour & Schneider, 2006; Elenkov *et al.*, 2005; Kokubu & Nashioka, 2006a; Mumford, 2000; Wilmshurst & Frost, 2001). These studies found that the upper management support played a fundamental role in the enhancement of the adoption of innovations and new practices. For example, Wilmshurst and Frost (2001) found that limited support of upper management for environmental accounting was one of the key factors inhibiting the adoption of its related systems and practices. These findings also are consistent with TOE framework (Tornatzky & Fleischer, 1990) that assumes the organizational factors significantly impact on adoption process of innovation and new techniques.

In addition, Chang and Deegan (2010) found that lack of support from top management was one of key barriers to making accounting changes in an organization, and they argued that if top managers did not realize the importance and potential benefits of EMA, EMA adoption would not be adopted. In this context, Mumford (2000) also found that favorable attitude of the top executives toward innovations and changes facilitated and enhanced the adoption of innovations and new practices, through their moral and physical support given to members of the organization. Baird *et al.* (2007) found that the top management support was associated strongly and positively with success at all levels of the adoption of activity management. The literature has shown the link between leaders of firms, its culture and its performance. Schein (1992) suggests that leaders of firms enforce and create organizational culture. Twati (2007) found that the majority of the senior managers favored a hierarchy culture in many Libyan firms, which provides them with authority

and formal relationships over their subordinates. Thus, many are not yet convinced of innovative practices and do not accept new technology. They would resist the adoption of modern management information systems and new practices which includes the adoption of EMA.

From the above results, it is clear that support by top management will increase the readiness and intention of the Libyan firms in both sectors to adopt EMA, and in turn facilitates the adoption process. In other words, firms with a high level of support from top management are more likely to perceive the benefits and importance of EMA, and thus are more willing to adopt EMA practices than those without the support of top management. However, the results of this study show that most firms in Libya have not yet adopted EMA practices. Hence, the present study suggests that the upper management in Libyan firms should provide more support to help them to adopt EMA practices, and top management support is needed to reinforce the adoption process.

#### **5.4.2 Environmental Variables and Intention to Adopt EMA**

Based on the TOE framework, institutional theory, legitimacy theory, stakeholder theory, and prior literature related to the adoption of innovations in general, and the EMA adoption in particular, four independent variables were selected as significant factors for the environmental context and for analyzing EMA practices adoption in the oil and manufacture sectors in Libya. The independent environmental variables encompassed coercive pressures, normative pressures, legitimacy considerations and stakeholder pressures. The findings related to the relationships between the environmental variables and the intention to adopt EMA will be discussed below.

#### **5.4.2.1 Coercive Pressures and Intention to Adopt EMA (H5)**

The results showed that the Libyan firms had moderate coercive pressures (Mean=3.08). In terms of correlations, the association between coercive pressures and intention and readiness Libyan firms to adopt EMA was positive, and highly significant. The findings supported the hypothesis that there is a significant positive relationship existed between the coercive pressures and intention to adopt EMA ( $b = 0.188, p < .001$ ). Thus, with increasing coercive pressures, firms are more willing to adopt EMA practices, implying that coercive pressures affect the adoption of EMA. The finding is in line with institutional theory that emphasizes the impact of social, economic and political institutions on an organization's behaviour with regard to making changes and adopting new systems or practices (Bouma & Van der Veen, 2002; Chang, 2007; Rikhardsson *et al.*, 2005). Moreover, institutional theory asserts that coercive pressures exerted by the government and legalisation can compel organizations to make organizational changes and adopt certain attributes to gain legitimacy of their operations. As such, organizations operating in the public sector tend to conform to policies and requirements issued by the government, due to their dependence on financial support provided by the government for their survival. With respect to environmental practices, the coercive pressures can lead to the adoption of new techniques due to the need to comply with environmental regulations (DiMaggio & Powell, 1983). In addition, these findings are consistent with TOE framework (Tornatzky & Fleischer, 1990) that propose the environmental factors significantly influence on adoption process of innovation and new techniques.

These results also are consistent with the findings yielded by the previous studies (e.g. Abrahamson, 1991; Delmas, 2002; Delmas & Toffel, 2004b; Delmas & Toffel, 2008;

DiMaggio & Powell, 1983; Hoffman, 2001; Lapsley & Wright, 2004; Sutton *et al.*, 1994), which found that coercive pressures could enhance the adoption of innovations and new practices. Abrahamson (1991) asserts that the government is generally one of outside groups that has a great influence on managerial innovations. Lapsley and Wright (2004) argue that the adoption of innovations is greatly influenced by government pressures, in particular, in firms operating in the public sector because the employees in these organizations are more willing to comply with the governmental guidelines and policies. On the other hand, King *et al.* (1994) stated that government assistance has played a main role in hastening the adoption of information technology within SMEs.

With respect to EMA, the findings of this study in line with the past literature indicates that the governments and affiliate agencies can play an effective role to encourage organizations to adopt EMA (e.g. Ambe, 2007; Chang, 2007; IFAC, 2004; Kokubu, 2002; Kokubu & Nashioka, 2006b; Mia, 2005; Scavone, 2006b; UNDS, 2000). For example, Ambe (2007) argues that government pressure is one of important factors which may affect organizations' behavior about the adoption and implementation of EMA. Several studies found that government pressure had a positive influence. For example, Lapsley & Wright (2004) found that the adoption of accounting innovations by firms in the public sector is largely affected by government influence. Kokubu (2002) found that the guidelines developed by the Japanese government and affiliate agencies regarding EMA played a vital role in encouraging many Japanese firms to introduce EMA practices to their managerial systems. Kokubu and Nashioka (2006b) also found that the governmental guidelines and policies had a strong effect on EMA practices within many organizations in different

industry sectors. According to Chang (2007), without governmental pressures in regard to establishing guidelines, regulations, and laws that bind organizations with accounting procedures and practices related to environmental management, the organizations will be less likely to adopt EMA. Therefore, increasing coercive pressures by the government would positively affect the intention and willingness of Libyan firms to adopt EMA.

From the above results, it is clear how important coercive pressures exerted by the government and environmental legislations in pushing and encouraging firms to adopt EMA practices. The government has the ability to issue needed legislation and provide programs, guidelines, and even the rewards to motivate organizations to encourage firms to adopt EMA practices. The results of the current study provide support for the claim that government pressure will lead to enhancement of adoption of EMA. Although the influence of coercive pressures exerted by the Libyan government and environmental legislations was smaller compared to other environmental variables with a magnitude of 0.188, however, it was positive and statistically significant. This pressure obviously does exert a significant influence on Libyan firms' intention to adopt EMA; therefore, it is necessary to increase the coercive pressures on the firms to become more accepting and willing to adopt EMA. In other words, firms that receive intense pressures from the government and legislation are more likely to perceive the benefits and importance of EMA, and thus are more willing to adopt EMA practices than those who do not. The results of this study have shown that most firms in Libya have not yet adopted EMA practices, implying that the government should impose more pressures and provide initiatives to enhance EMA adoption in Libyan firms. Therefore, the role of government and the

environmental legislation must be taken in account, and needs to be addressed explicitly in future research.

#### **5.4.2.2 Normative Pressures and Intention to Adopt EMA (H6)**

The results showed that the Libyan firms had moderate normative pressures (Mean =3.10). In terms of correlations, the association between normative pressures and intention and readiness of Libyan firms to adopt EMA was positive, and highly significant. The findings supported the hypothesis that there is a significant positive relationship existed between normative pressures and the intention to adopt EMA ( $b = 0.262, p < .001$ ). Thus, with increasing normative pressures, firms are more willing to adopt EMA practices, implying that normative pressures influence the adoption of EMA.

These results are in line with the argument of the institutional theory that the normative pressures by exerted by professional bodies or formal education can change professional behaviours and organisational practices (DiMaggio & Powell, 1983). Additionally, these results are consistent with TOE framework (Tornatzky & Fleischer, 1990) that propose the environmental factors significantly influence on adoption process of innovation and new techniques. Such findings also were consistent with earlier results in similar studies suggesting that normative pressures exerted by professional associations and formal education can enhance the adoption of innovations and new practices (e.g. Carmona & Macias, 2001; Chang, 2007; DiMaggio & Powell, 1983; IFAC, 2005; Jalaludin *et al.*, 2011; Li, 2004).

Chang (2007), for instance, argues that professional organizations represent one of the important vehicles that drive organizational and accounting changes. Li (2004) suggests that the professional bodies such as the ISO and GRI greatly contributed to the prevalence of environmental management systems (EMS) during the 1990s, when they issued several initiatives, guidelines, and standards on environmental management, environmental accounting, indicators of environmental performance and reporting. These guidelines and standards assisted and encouraged many firms to adopt and implement several programs, systems, practices on environmental management, accounting and reporting in many developed countries around the world. This led to the creation of normative pressure on the corporations in many countries, seen through organizations' behaviour of introducing fundamental changes and new innovations to their systems, including accounting (Chang, 2007).

According to DiMaggio and Powell (1983), the professional bodies and formal education contributed by putting and increasing normative pressures for changes to organizational practices, and professional behavior, where the individual's method, work practices and their opinions in managing different issues are often affected by the individual's educational background (Bennett *et al.*, 2006). Thus, the professional associations, and formal education can play a vital role in exerting pressures to influence organizations to adopt EMA practices, as explained by Chang (2007).

In addition, empirical evidence provided by several previous studies showed that the normative pressures had positive and significant effects on the adoption of information technology (IT) (Khalifa & Davison, 2006; Silva & Figueroa, 2002; Son & Benbasat, 2007). For example, Khalifa and Davison (2006) found a positive and



significant effect of normative pressures on the intention to adopt electronic trading systems at small and medium-sized enterprises (SMEs). Son and Benbasat (2007) found that normative pressures had a significant impact on the organizations' intention to adopt electronic marketplaces. The study of Jalaludin *et al.* (2011) showed that normative pressure was found to have significantly affect the EMA adoption level.

From the above discussion, it is clear that intense normative pressures will enhance EMA adoption. The findings of this study showed that normative pressures exerted by the professional bodies and formal education had the second strongest influence among the environmental variables on the intention to adopt EMA, with a magnitude of 0.262; and it was positive and statistically significant. Therefore, this study suggests that professional bodies and formal education should play their role in exerting more normative pressure on Libyan firms to adopt EMA, as their performance could be enhanced if EMA practices were adopted compared with the situation in other countries especially in developed countries. This pressure obviously does exert a significant influence on the Libyan firms' intention to adopt EMA, indicating that the role of professional bodies and formal education in impacting EMA adoption process must be taken seriously.

In other words, the firms with a high level of normative pressures are more likely to perceive the benefits and importance of EMA, and thus are more willing to adopt EMA practices than those without. The results of this study have shown that most firms in Libya have not yet adopted EMA practices, implying that the professional

bodies and formal education should play a greater role to encourage Libyan firms to adopt EMA and, in addition, addressed more explicitly in future research.

#### **5.4.2.3 Legitimacy Considerations and Intention to Adopt EMA (H7)**

The results showed that the Libyan firms had moderate legitimacy considerations (Mean=3.30). In terms of correlations, the association between legitimacy considerations and intention the Libyan firms to adopt EMA was positive and highly significant. The findings supported the hypothesis that there is a significant positive relationship existed between the legitimacy considerations and the intention to adopt EMA ( $b = 0.320$ ,  $p < .001$ ). Thus, the legitimacy considerations will effectively influence the firms' intention to adopt EMA practices, implying that the adoption process of EMA is impacted by the legitimacy considerations. Additionally, these results are consistent with TOE framework (Tornatzky & Fleischer, 1990) that propose the environmental factors significantly influence on adoption process of innovation and new techniques.

This result is compatible with the legitimacy theory that proposes that organizations must respond to the needs of society in order to retain their legitimacy and to satisfy stakeholders (Chang, 2007; Cho & Patten, 2007; Patten, 1991, 1992, 2002; Patten & Crampton, 2003). It emphasizes that the behaviour of the organizations towards their environment must continually evolve to adapt to change in wishes and expectations of the community in order to maintain their survival (Sethi, 1974). Additionally, the result supports the idea that organizations will pursue certain actions and adopt techniques aimed at providing particular information for gaining or maintaining legitimacy when they consider the provision of such information is critical to ensure

their survival. This finding is consistent with those of previous studies (Delmas & Toffel, 2004b; Delmas & Toffel, 2008; Florida & Davison, 2001; Hoffman, 2001; Prakash, 2001; Summers, 2002). According to Hoffman (2001), pressures imposed by social activists represent one of visible drivers that push organizations to introduce environmental considerations including accounting practices. In the other words, organizations' responsibility toward the society in general and environment-related issues might be an important reason to undertake changes in accounting practices.

In addition, Delmas and Toffel (2004b) argue that decisions of organizations concerning the adoption of environmental practices are impacted by the need to improve their image, maintain their relations and their legitimacy in the society. On this basis, Burritt (2005) argues that EMA information will become necessary if organizations wish to lower their environmental impacts and related costs in order to maintain their legitimacy in the eyes of stakeholder groups in the society. This in turn may considerably influence firms' behavior on their intention to adopt EMA.

A review of related literature shows that the adoption of environmental management practices within the organizations has been impacted by their desire to be better, or to maintain their relations with communities, as stated by Delmas and Toffe (2004b). For example, Florida and Davison (2001) found that there was a positive correlation between the adoption of several environmental practices, and organizations which had active engagement with their communities. Furthermore, empirical evidence indicates that pressure groups in the community have influenced the firms to adopt environmental plans and practices (Henriques and Sadorsky, 1996). The above discussion highlights the importance of legitimacy considerations in influencing

organizations to adopt EMA. Legitimacy considerations had the strongest effect of all environmental variables on the intention to adopt EMA, with a magnitude of 0.320; and it was positive and statistically significant. This pressure evidently does exert a significant influence on Libyan firms' intention to adopt EMA, indicating that the role of legitimacy considerations in impacting EMA adoption process must be taken seriously. In other words, firms with a high level of legitimacy considerations are more likely to perceive the benefits and importance of EMA, and thus are more willing to adopt EMA practices than those without a high level of legitimacy considerations.

#### **5.4.2.4 Stakeholder Pressures and Intention to Adopt EMA (H8)**

The results showed that the Libyan firms had moderate stakeholder pressures (Mean =3.04). In terms of the correlations, the association between stakeholder pressures and the intention of Libyan firms to adopt EMA was positive, and highly significant. In addition, the findings of current study demonstrated a significant positive relationship existed between the stakeholder pressures and intention to adopt (b = 0.240,  $p < .001$ ). Thus, with increasing stakeholder pressures, firms are more willing to adopt EMA practices, indicating that the adoption process of EMA is influenced, to a large extent, by stakeholder pressures. This lends support to the stakeholder theory, that organizations tend to respond to the demands of stakeholders, particularly those that are powerful, as these stakeholders influence their operations, or control their resources, and they will ignore demands from less powerful and influential stakeholders (Bouma & Kamp-Roelands, 2000; Burritt, 2005; Chang, 2007; Deegan & Blomquist, 2006). Moreover, ethical and managerial branches of the stakeholder theory emphasize that organizations should consider the demands of stakeholders

when they operate, and provide information to them for getting or preserving support, and it is also the right thing to do to ensure success and survival (Chang, 2007). Thus, demands made by stakeholders can help to enhance the intention of organizations to adopt needed techniques. In addition, these results are consistent with TOE framework (Tornatzky & Fleischer, 1990) that propose the environmental factors significantly influence on adoption process of innovation and new techniques.

This result is also consistent with the findings of previous studies (e.g. Bansal & Roth, 2000; Christmann & Taylor, 2001; Darnall *et al.*, 2009; Delmas & Toffel, 2004b; Henriques & Sadosky, 1996; Kollman & Prakash, 2002). For instance, Bansal and Roth (2000) indicate that the pressures exerted by external stakeholders, such as local communities, governments, environment protection agencies and financial institutions play a vital role in getting organizations to deal with environmental issues. Darnall, Henriques and Sadosky (2009) found a positive relationship between the stakeholder pressures and the adoption of proactive environmental practices. In addition, Kollman and Prakash (2002) found that a firm's decision to adopt environmental management practices was strongly affected by stakeholder's pressures, emanating from regulators, suppliers, regional chambers of commerce, and industry associations.

In the context of EMA, the pressures exerted by various stakeholders can play an important role in influencing organizations' intention to adopt EMA. Viere *et al.* (2006b), for example, argue that with the absence of stakeholder pressures, the organizations would not worry about environmental and sustainability issues, and thus they might not be enthusiastic to adopt EMA.

From the above discussion, it is clear that intense stakeholder pressures will enhance EMA adoption. The results of this study showed that stakeholder pressures represented the third strongest influence among the environmental variables on the intention to adopt EMA with a magnitude of 0.240; and it was positive and statistically significant. Therefore, this study suggests that stakeholder groups should play their role in exerting more pressures on the Libyan firms to adopt EMA, as firms could enhance their performance if EMA practices were adopted. At the same time stakeholder groups can use the EMA information to evaluate the environmental performance of firms. This pressure clearly does exert a significant influence on Libyan firms' intention to adopt EMA, indicating that the role of stakeholder pressures in impacting EMA adoption process must be taken in account. In the other words, firms that receive a high level of the pressures from stakeholders are more likely to perceive the benefits and importance of EMA, and thus are more willing to adopt EMA practices than those that do not. However, the results of this study have shown that most firms in Libya have not yet adopted EMA practices, implying that stakeholders should impose more pressures on Libyan firms to adopt EMA practices and, in addition, addressed more explicitly in future research.

#### **5.4.3 The Mediating Role of Perceived Benefits and Perceived Importance on the Intention to Adopt EMA**

The innovation and adoption literature points to perceptions of the importance and the benefits of the systems and practices as helping to mediate the intention to adopt them in organizations. Therefore, this study expected that would be technological characteristics, which include perceived benefits and perceived importance mediator of the relationship between each of (organizational and environmental variables) and intention to adopt EMA. Such expectation was built on the assumption that the

influence of both of organizational environmental variables on the intention to adopt EMA may not be only direct, and this influence may be through the perceived benefits and perceived importance of EMA, which consequently lead to enhance the intention to adopt EMA. Such thoughts can be considered to be one assumption of TAM model as outlined Davis (1989), and the TOE framework as outlined by Tornatzky and Fleischer (1990), who noted that the individuals' perceptions and attitudes on the importance and benefits of an innovation or technology can play important role to influence on the intention behavior of individuals to adopt this innovation. Drawing on the work done by Davis (1989), Davis, Bagozzi and Warshaw (1989), Tornatzky and Fleischer (1990), Baron and Kenny (1986), and MacKinnon *et al.* (2002), this study attempts to assess the mediating role of both perceived benefits and perceived importance of EMA with organizational and environmental factors as independent variables on the intention to adopt EMA in the Libyan context.

#### **5.4.3.1 Organizational Variables**

The results of the regression analysis did not fully support postulates (H1a, H2a, H3a, and H4a) which can mediate the relationship between organizational variables and intention to adopt EMA. The findings showed the existence of indirect relationships between the organizational variables (prospector strategy, nature of formalization, clan culture, adhocracy culture, market culture and hierarchy culture) and the intention to adopt EMA when adding perceived benefits of EMA. This implies that perceived benefits did play a mediating role in the EMA adoption process. Thus, it shows that the organizational variables (prospector strategy, nature of formalization, clan culture, adhocracy culture, market culture and hierarchy culture) do not directly

influence the intention to adopt EMA, but instead, they have indirect effects through perceived benefits of EMA.

These findings support assertions by Chau and Tam (1997) and Tornatzky and Fleischer (1990), who suggest that the organizations will be more likely to adopt innovations, systems, practices and new ideas if they perceive their potential benefits. Such results are consistent with the TAM model of Davis (1986), which proposes that the perceived benefits are key factors that might influence intention behavior to adopt innovation, system, or technique by organizations. The findings are also consistent with the finding of Twati (2007), on the perceived usefulness (benefits) mediated relationship between organizational culture type and adoption of management information systems within Libyan organizations.

Meanwhile, the perceived importance of EMA plays a mediator role in the relationships between the organizational variables (prospector strategy, defender strategy, nature of formalization, clan culture, adhocracy culture, hierarchy culture, and top management support) and the intention to adopt EMA. This implies that perceived importance does play a mediating role in the EMA adoption process. Therefore, it is assumed that people in Libyan firms would accept and adopt EMA when they perceived its importance. In the other words, organizational variables (prospector strategy, defender strategy, and nature of formalization, clan culture, adhocracy culture, hierarchy culture, and top management support) may not directly influence the intention or willingness of firms to adopt EMA, but instead have an indirect influence, by perceiving the importance and benefits of these practices.



These findings concur with those of past studies (Chau & Tam, 1997; Haines, Street & Haines, 2008; Janvrin *et al.*, 2008; Robin, Reidenbach & Forrest, 1996; Singhapakdi, Gopinath, Marta & Carter, 2008; Tsai & Tai, 2003), which showed that the perceived importance had an important influence on decision-making, intention and behavior of people toward many issues. For example, Chau and Tam (1997), found support for the positive relationship between the perceived importance of open systems properties and open systems adoption. Robin *et al.* (1996) found empirical support that the perceived importance of ethical issue influenced ethical judgment and behavioral intention. On the other hand, Tsai and Tai (2003) found that perceived importance played a mediating role in the relationship between training assignment and training motivation.

Therefore, it is assumed that people in Libyan firms would accept and adopt EMA when they perceived its importance and benefits. The failure to adopt EMA indicates that the Libyan firms have not yet accepted and implemented EMA. Although, the findings of this study showed that most of the managers who were surveyed expressed their intention or willingness and desire to adopt EMA practices, when they perceived the benefits and importance. However, EMA was not adopted in their firms, possibly because the managers in Libyan firms were more inclined to the defender strategy than prospector strategy. Another possible explanation for these findings is attributable to the high power distance culture among the Libyan employees (Hofstede, 1980; Twati, 2007). For example, Twati (2007) found that the high power distance means respect for the authority that might influence managers' intention and their attitudes toward adoption of technology and management information systems.

In addition, the dominant hierarchy organizational culture practiced in Libyan firms may be another possible reason to explain these findings. Within such a context, individuals are less likely or willing to accept and adopt changes and new ideas. The findings are consistent with the suggestion of Srinivasan and his colleagues (2002), Twati and Gammack (2006) and Twati (2007), that organizations dominated by hierarchical culture are less enthusiastic about the adoption of technology and management information systems.

The demographic characteristics of the respondents could also be one of reasons that impeded the adoption of EMA practices within the Libyan firms. It was found that 49% of respondents in this study had been in their positions for more than ten years. Managers with long tenure in their positions would be less willing and enthusiastic to adopt EMA. Previous studies such as Damanpour and Schneider (2006) explained that managers with long tenure would be less inclined to adopt innovations and organizational practices due to vested interests in the status quo.

Surprisingly, not many empirical studies have examined the impact of organizational factors (business strategy, nature of formalization, organizational culture and top management support) particularly, EMA adoption (Chang, 2007; Ferreira *et al.*, 2010). According to Chang (2007), the effect of many of factors on EMA adoption remains uncertain. Furthermore, there is limited evidence concerning the influence of these variables on the EMA adoption process. The results from this study provide a significant contribution to literature in terms of organizational variables (business strategy, nature of formalization, organizational culture and top management support) and their impacts on the intention to adopt EMA. The findings also offer an explanation for the financial and environmental managers' attitudes on EMA

adoption, their perceptions of the importance and benefits, and their roles in enhancing firms' intention to adopt EMA practices.

#### **5.4.3.2 Environmental Variables**

The results from regression analysis did fully support the postulates (H5a, H6a, H7a, and H8a) which can mediate the relationships between the intention to adopt EMA and the environmental variables. The findings showed that both perceived benefits and perceived importance played a mediating role in the relationships between environmental variables (coercive pressures, normative pressures, legitimacy considerations and stakeholder pressures) and intention to adopt EMA (see Tables 4.48 and 4.49). In other words, these variables may not influence directly on the intention or willingness of Libyan firms to adopt EMA practices, but instead influence indirectly by perceiving the importance and benefits of these practices. This finding supports the claim made by other researcher, for example, Ferreira *et al.* (2008, 2010) who claimed that perceived benefits of EMA are likely to encourage firms to adopt and use this technique as a means of enhancing or maintaining the competitive advantage of the organizations. The result is also consistent with TAM model of Davis (1986), which proposed the perceived benefits as an important factor that might influence intention behavior to adopt innovation, system, or technique by organizations.

The finding also provides further support to back up the claim that perceived benefits has a significant effect on the adoption of innovations (Beatty *et al.*, 2001; Iacovou *et al.*, 1995; Kuan & Chau, 2001; Twati, 2007). For instance, Twati (2007) found that the perceived benefits play a mediating role in the relationship between societal

culture and the adoption of management information systems in Libyan organizations. Iacovou, Benbasat and Dexter (1995) found perceived benefits had a positive relationship with electronic data interchange adoption.

The findings of this study provide empirical evidence that external pressures exerted by different parties such as government, legislations, professional bodies, education formal, community and stakeholders have a significant impact on the firms' intention to adopt EMA. The findings also suggest that the external pressures make a significant impact on perceived benefits and perceived importance of EMA, which in turn plays an important role in enhancing firms' intention to adopt EMA. These findings are similar to the earlier studies, for example, Kurnia and Kurnia, Alzougool, Ali and Alhashmi (2009) found that the influence of external pressures was a significant factor in the adoption of all electronic commerce technologies. Delmas and Montiel (2008) revealed that government commitment to the environment played an important role in facilitating the early adoption of ISO 14001 in the chemical industry.

Although, most of the managers who were surveyed expressed their willingness and desire to adopt EMA, and they perceived its benefits and importance as well as external pressures exerted by different parties, EMA was not adopted in the Libyan firms. This may perhaps be explained by similar reasons as mentioned in the earlier section. In general, the findings of this study indicate that external pressures exerted by the government, legislations, professional bodies, education formal, community and stakeholders on Libyan firms are still weak. Therefore, the awareness of managers, working in the Libyan firms, of benefits and importance of EMA and also of these pressures should be increased to encourage them to take actions to adopt

EMA practices. The government will need to work with firms in two industries (oil and manufacturing sectors) to set up resources, standards, rules and training programs that enhance the adoption of EMA.

The ministry of industry and also ministry of petroleum, which are responsible for firms in the respective sectors, need to set up procedures and standards that encourage the firms in both sectors to adopt EMA. Libyan firms in both industry sectors also need support from the bodies which are interested in the development of accounting profession, as well as those are interested in the protection of the environment.

The support, from the government, industry and profession bodies, includes providing a more comprehensive view about EMA practices such as increasing the awareness of EMA, specifically the importance and benefits of EMA, and providing initiatives, programmes, resources, professional experience and conducting training courses that facilitate the acceptance, adoption and implementation of these practices.

According to Delmas and Montes-Sancho (2010), government's commitment to the environment will enable firms to see the perceived benefits of adopting ISO 14001, which in turn will have a positive influence on the adoption process. The findings from this study provide a significant contribution to literature in terms of the environmental variables (coercive pressures, normative pressures, legitimacy considerations and stakeholder pressures) and their relationships, with perceived benefits and perceived importance and their impacts on the intention to adopt EMA within Libyan firms in both oil and manufacturing sectors.

## **5.5 Contributions of the Study**

This study has contributed to the knowledge of EMA and adoption of organizational practices. The contributions of the present study are divided into theoretical, practical and methodological aspects.

### **5.5.1 Theoretical Contributions**

First, this study at a broad level has contributed to EMA literature by identifying and demonstrating what factors may impact EMA adoption, one of the recent innovations in management accounting. To date, several factors that might influence the adoption of EMA have remained fully not uncovered, and consensus has not yet been reached, as is obvious from a literature review. The current study has extended the EMA literature by examining various factors that may influence the intention to adopt EMA practices.

A significant body of literature has examined the EMA technique; nevertheless, limited attention has been given to examining the factors that may influence the EMA adoption process. This study attempts to fill this gap by examining this issue by developing a framework that can be used to explain the adoption of EMA practices and specifically, the intention behavior to adopt these practices. This framework has been built by using the TAM and TOE frameworks with contingency theory, institutional theory, legitimacy theory and stakeholder theory.

Second, this study is among the few studies that empirically investigated the path analysis of the relationships between various factors from three contexts (technological, organizational, environmental), and the intention behavior to adopt

EMA, based on the TOE framework of Tornatzky and Fleischer (1990). These factors include business strategy, nature of formalization, organizational culture, top management support, coercive pressures, normative pressures, legitimacy considerations, stakeholder pressures, perceived benefits and perceived importance of EMA. This has extended the scope of factors that may impact the EMA adoption process by integrate new variables which include nature of formalization and organizational culture. This has extended the scope of factors that may impact the EMA adoption process by integrate new variables, which include nature of formalization and organizational culture.

Third, the findings provided in EMA literature remain ambiguous and sometimes contradictory due to the absence of a theoretical framework founded on theories related to innovations and diffusion. This current study represents one of the few studies that filled this knowledge gap by examining the impact of technological factors which include perceived benefits and perceived importance of EMA, as little attention has been given to examine the effect of such factors in EMA context. In addition, the current study represents the first effort to test the mediation effect of both perceived benefits and perceived importance of EMA, based on the TAM and TOE perspectives.

The findings have contributed to EMA and adoption literature by showing the link between organizational, environmental and technological variables with the intention to adopt EMA. In addition, the results have contributed to EMA knowledge, specifically the innovation and organizational adoption literature, by showing the

mediation role of perceived benefits and perceived importance in enhancing the adoption process of organizational practices.

### **5.5.2 Methodological Contributions**

Few studies have empirically examined EMA adoption and use by using the instrument that reflects EMA activities and includes its physical and monetary aspects, as suggested by Burritt *et al.* (2002). The study of Ferreira *et al.* (2010) was the first attempt made to develop and use an instrument to measure EMA use in large firms, which used twelve items to represent EMA activities. He asked about the use of EMA in firms over a period of three years. In this study, the researcher adapted Ferreira *et al.* (2010)'s instrument to measure both the intention to adopt EMA and the perceived importance of EMA in firms. The framing of the original instrument was changed to reflect this situation, which took into account the methodological contribution of this study, for the validation of this instrument in developing countries, particularly in Libya. The instrument was tested and Cronbach's alpha statistics for the overall scale of the intention to adopt the EMA variable were 0.970, and 0.959, for the perceived importance variable, generally accepted as representing high reliability (Hair *et al.*, 2010), and these numbers are consistent with findings of other studies such as (Christ & Burritt, 2013; Ferreira *et al.*, 2010), thus the instrument can be used for further research in other countries.

The literature revealed that few studies have empirically examined the impact of the coercive pressures, normative pressures, legitimacy considerations and stakeholder pressures on the adoption of EMA. Therefore, this study developed new instruments to measure these variables. Coercive pressures consisted of nine items covering a



combination of attributes to reflect various aspects of this variable derived from various sources (e.g. Kokubu, 2002; Lapsley & Wright, 2004; Lin, 2001). Normative pressures, consisted of seven items on a combination of attributes representing various aspects of this variable derived from various sources (e.g. Baird *et al.*, 2007; Bennett *et al.*, 2006; Chang, 2007; Delmas, 2002; DiMaggio & Powell, 1983; IFAC, 2005; Li, 2004). Legitimacy considerations consisted of five items, covering a combination of attributes representing various aspects of this variable derived from various sources (e.g. Bansal & Roth, 2000; Céspedes-Lorente *et al.*, 2003). Stakeholder pressures, consisted of five items, incorporated a combination of attributes representing various aspects of this variable derived from various sources (e.g. Céspedes-Lorente *et al.*, 2003). These instruments were validated by conducting a reliability test and subsequently used for the purposes of this research.

The Cronbach's alpha statistics for coercive pressures were 0.958, 0.958 for normative pressures, 0.897 for legitimacy considerations, and 0.927 for stakeholder pressures, generally accepted as representing high reliability (Hair *et al.*, 2010). The results from this study revealed that coercive pressures, normative pressures, legitimacy considerations and stakeholder pressures had significant effects on the intention to adopt EMA in Libya. These instruments were validated, and can be used for further research in other contexts. Most previous studies related to EMA adopted either the conceptual approach or case study approach, and limited attention has been given to the survey approach to examine EMA related issues. This study has filled this knowledge gap by using a survey questionnaire to collect data on factors affecting the intention to adopt EMA. This method can enhance the reliability and credibility of the results and could be considered as a methodological contribution.

### **5.5.3 Practical Contributions**

An overview of the previous literature has indicated a dearth in research on EMA status in developing countries, and specifically in Arab countries including Libya (Burritt, 2004). Notable that past studies with regards to the environmental issues in Libya only focused on disclosures, and not on the actual environmental accounting practices (Abdulhamid, Ritchie, Lovatt & Pratten, 2005; Ahmad, 2004; Bayoud, Kavanagh & Slaughter, 2012; Elmogla, 2009). Therefore, this study contributes to the enhancement of understanding of the status of EMA in developing countries such as Libya. By locating the study in Libya, a developing country, the present study has provided insights into attitudes and behavior firms towards an environmental management accounting innovative practice. Additionally, current study contributed in growing awareness within Libyan firms of the EMA role in maintaining the environment and reducing their environmental impacts. This study may help to create or improve the awareness of the decision makers in Libyan industrial firms towards EMA's role in improving both of the economic and environmental performance and achieving the sustainability. As well as, this study highlighted on the factors that may enhancement the adoption of EMA practices within Libyan firms. Thus, this study might represent a step toward the direction of protecting the environment, which considered as globally problem.

In conclusion, this study has provided EMA literature with more evidence of the impact of related organizational, environmental and technological factors on firms' intention to adopt EMA in Libya. The study has contributed to opening up an exchange of ideas within Libya and other countries on issues related to the acceptance and adoption of EMA. It highlights the contribution, which could enhance the

intention to adopt EMA among the firms in Libya and other countries. Knowledge gained from further studies, such as the present study, may enhance the intention of firms to adopt EMA technique in order to enhance environmental performance by using this technique, simultaneously reaping economic benefits.

### **5.6 Implications of the Study**

In general, the results of the study indicated that paying attention to environmental issues benefit both the environment condition and objectives of firms in Libya. It was found that issues such as adopting EMA practices in the Libyan firms will make these firms more environmentally sound and reduced its impacts on the environment. The results of the study suggested that manufacturing firms that seek to enhance their environmental performance should focus more on adoption new techniques such as EMA. Therefore, firms should focus more on enhancing employees' awareness towards the importance and benefits of EMA, this is will make these firms more willing to adopt EMA, which can improve their economic and environmental performance and achieve the sustainability by cost reduction and improving of the resources use.

The results of this study also emphasized that organizational factors which include (strategy type, nature of formalization, organizational culture type, and the level of top management support can play an important role in enhancing or impeding firms' intention to adopt EMA. The results of this study suggest that hierarchical culture is dominant in the Libyan firms, and provided evidence that hierarchy organizational culture has a negative significant relationship with the intention to adopt EMA. In other words, firms practicing hierarchical culture are less likely to perceive the

benefits and importance of EMA, and thus are less inclined to adopt EMA practices. This may provide important explanations for non- adoption of EMA in Libya to date. This result was in line with the arguments in literature indicate that firms with hierarchical culture are less enthusiastic about the adoption of management information systems and the technology in general (e.g. Shokshok *et al.*, 2010; Trivellas & Dargenidou, 2009; Twati, 2007).

Moreover, the results demonstrated that the increasing of pressures from the external parties such as government, professional bodies, society and stakeholders will lead to enhance manufacturing firms' intentions and their willingness to adopt EMA. In other words, firms that receive a high level of the pressures from the external parties are more likely to perceive the benefits and importance of EMA, and thus are more willing to adopt EMA practices than those that do not. This is in line with arguments in literature indicate that the pressures from the external parties play an essential role in encouraging firms to adopt organizational techniques, and environmental management systems and practices (e.g. Bansal & Roth, 2000; Delmas, 2002; Florida & Davison, 2001; Henriques & Sadorsky, 1996; Hoffman, 2001; IFAC, 2004, 2005; Kollman & Prakash, 2002; Lapsley & Wright, 2004; Prakash, 2001; Summers, 2002). The results of this study have shown that the level of external pressures was not stronger; hence, most industrial firms in Libya have not yet adopted EMA practices. This implies that the external parties should impose more pressures on Libyan firms to adopt EMA practices.

In addition, this study has provided evidence that perceived benefits and perceived importance of EMA has a positive relationship with the intention to adopt EMA. They

are considered important factors in facilitating the adoption of EMA. This is consistent with past literature (e.g. Alatawi *et al.*, 2012; Davis, 1989; Ferreira *et al.*, 2008, 2010; Oliveira & Martins, 2011; Tornatzky & Fleischer, 1990; Tsai & Tai, 2003; Twati, 2007), which indicate that the perceived benefits and the perceived importance are important factors in facilitating the adoption of technology in general, and management information systems in particular. Hence, future studies should take into account the impact of these factors on the adoption of EMA practices.

### **5.7 Limitations and Future Research Directions**

This study has a number of limitations that need to be addressed in future research. From a methodological viewpoint, this study examined firms in the oil and manufacturing sectors in Libya and involved the financial directors and environmental managers. The caution should be taken when generalizing the results due to the sample and population of the study. Therefore, future research should extend the scope of the study to involve other decision makers and other firms such as foreign firms working in Libya and firms working in the services sector, which are not covered in the present study.

Another caveat concerns the limited time of this research. Since the current study is a cross-sectional study, which gathered the data from the respondents at a point of time, future research can adopt longitudinal studies which might offer different findings.

Although 202 respondents can represent an acceptable sample size for this type of studies, future studies should increase the sample size to obtain stronger results. On the other hand, this study only examined the relationships between a number of

variables and the intention to adopt EMA. Thus, future studies should examine other variables that may influence the adoption process of EMA such as societal culture. Furthermore, future research could examine the relationships presented in this study to determine whether the findings could also apply to other countries, and conduct a comparative analysis between the status of EMA practices in Libya and other developing countries.

## **5.8 Conclusion**

The present study was conducted to examine empirically the influence of the independent organizational variables (prospector strategy, defender strategy, nature of formalization, clan, adhocracy, market, hierarchy organizational culture, and top management support), and the independent environmental variables (coercive pressures, normative pressures, legitimacy considerations, stakeholders pressures) on the intention of firms to adopt EMA practices, and subsequently the effect of the perceived benefits and the perceived importance of EMA as mediators, in the oil and manufacturing sectors in Libya.

This study has made important contributions by providing insights into the EMA adoption in both of oil and manufacturing sectors in Libya, an area that was neglected in related literature. This study has used a multiple regression analysis to test separately the influence of organizational and environmental variables with the intention to adopt EMA. The findings of this study showed that there were positive and significant relationships between all these variables and the intention of firms to adopt EMA (except hierarchy culture was significant but negative). However, these relationships were indirect through either perceived benefits or perceived importance.

The findings gained from this study are consistent with the theories and in line with the findings of previous studies, which supported these theories. The empirical evidence from this study has contributed to the body of knowledge in the fields of EMA and adoption of innovations. The results could also be used to provide information to the managers or decision makers, for them to consider the adoption of EMA practices, in order to obtain several benefits, and improve environmental performance and achieve sustainability.

This study represents one of the few that examined empirically the influence of a number of factors, from the technological, organizational and environmental contexts, based on the TAM and TOE frameworks. It also examined the mediating role of the perceived benefits and perceived importance of EMA in the relationships presented in this study. Further research is needed to examine other factors that may affect EMA adoption in order to gain important insights into EMA practices worldwide.

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## **APPENDICES**

## Appendix A

### **Factors Influencing the Intention to adopt Environmental Management Accounting within Libyan Firms**

## Questionnaire

“English Version”

## **The covering letter**

### **Dear Respondent**

The purpose of the study is to gain a better understanding of the factors that may influence on adoption of environmental management accounting (EMA) within firms in Libya. The adoption of EMA practices might lead to improve financial and environmental performance of Libyan firms because of the belief that EMA information will assist on reducing environmental impacts, and identification of environmental costs and estimation of environmental liabilities related to many activities.

Thus, I would like you to spend a little time around 25 minutes to answer this questionnaire related to EMA practices and the factors that influence on adoption process in your firm. Your answers are very important to the accuracy of my study. I would like to assure you that all information collected will be kept strictly confidential and will only be used for research purposes. I will not use your name or your firm's name when producing the findings of this study.

If you wish to enquire or need any assistance in completing the survey, please contact the researcher at the following address:

### ***Thank you***

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**Section A: Personal and Organizational Characteristics**

This part is general information about yourself and the organization that you work for.

**1. Gender:**

Male

Female

**2. Age:**

< 30 years old

30-40 years old

41-50 years old

> 50 years old

**3. Educational level:**

High School or Equivalent

Bachelor Degree or Equivalent

Master Degree

PhD Degree

**4. Function**

Financial Director/Financial Controller

Environmental Manager

Other .....

**5. Tenure in position**

< 3 years

3-5 years

6-10 years

>10 years

**6. Industrial sector of your firm:**

Oil and Gas

Chemical Industries

Cement & Building Material

Food Industries

Geometric & Electrical Industries

Metal Industries

Spinning and Fabric Industries

Furniture Industries

Other .....

**7. Ownership of your firm:**

Government

Private

Mixed

Other .....

**8. Number of employees in your firm:**

<100

100-200

201-300

301-400

401-500

>500

**Section B: Acceptance and Adoption of Environmental Management Accounting**

**B1. Perceived Importance of EMA**

Please read carefully the following items, which regard to (EMA) environmental management accounting practices, and indicate the extent of importance of each item in your firm by ticking (✓) in the suitable box. Choose only one answer.

Where: 1= not at all important; 2= unimportant; 3= neutral, 4= important; and 5= very important

	<b>Item</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1</b>	Identification of environment-related costs.					
<b>2</b>	Estimation of environmental-related liabilities.					
<b>3</b>	Classification of environment-related costs.					
<b>4</b>	Allocation of environment-related costs to production processes.					
<b>5</b>	Allocation of environment-related costs to products.					
<b>6</b>	Introduction of improvement to environment-related costs management.					
<b>7</b>	Creation and use of environment-related costs accounts.					
<b>8</b>	Development and use of environment-related key performance indicators (KPIs).					
<b>9</b>	Product life cycle cost assessments.					
<b>10</b>	Product inventory analyses ( i.e. the specification of the types and quantities of materials and energy required and the amount released to the environment).					
<b>11</b>	Product impact analyses (i.e. assessment of the environmental effect of competing product designs).					
<b>12</b>	Product improvement analyses (i.e. identification of opportunities for reduction of environmental impact).					

**B2. Have your firm adopted any of EMA practices?**

Yes  No

*\* If your answer is NO please go to question B3*

**B3.** Please indicate the extent to which your firm has the intention or willingness to adopt each of the following items by ticking (✓) in the suitable box. Choose only one answer.

Where: 1= not intent at all; 2= not intent; 3= neutral, 4= intent; and 5= intent to a great extent

	Item	1	2	3	4	5
1	Identification of environment-related costs.					
2	Estimation of environmental-related liabilities.					
3	Classification of environment-related costs.					
4	Allocation of environment-related costs to production processes.					
5	Allocation of environment-related costs to products.					
6	Introduction of improvement to environment-related costs management.					
7	Creation and use of environment-related costs accounts.					
8	Development and use of environment-related key performance indicators (KPIs).					
9	Product life cycle cost assessments.					
10	Product inventory analyses ( i.e. the specification of the types and quantities of materials and energy required and the amount released to the environment).					
11	Product impact analyses (i.e. assessment of the environmental effect of competing product designs).					
12	Product improvement analyses (i.e. identification of opportunities for reduction of environmental impact).					

### Section C: Perceived Benefits of EMA

Your firm perceives the benefits of environmental management accounting adoption. Please indicate the extent to which you agree or disagree with the following statements by ticking (✓) in the suitable box. Choose only one answer. Where: 1= strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree

	Item	1	2	3	4	5
1	Increased demand for green products.					
2	Increase in product margins.					
3	Increase in customer satisfaction.					
4	Cost of capital reduction.					
5	Insurance cost reduction.					
6	Operating cost reduction.					
7	Identification of new opportunities.					
8	Generation of process innovation.					
9	Generation of product innovation.					
10	Attraction of better quality staff.					
11	Improvement in productivity.					
12	Improvement in reputation.					
13	Improvement in decision making.					
14	Product costing improvement.					
15	Production process improvement.					



**Section D: Top Management Support**

Please indicate the extent to which top management supports EMA adoption in your firm, by ticking (✓) in the suitable box of each statements, and choose only one answer. Where: 1= strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree

	<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1</b>	Top management is interested in the adoption and implementation of EMA.					
<b>2</b>	Top management considers EMA practices important to the firm.					
<b>3</b>	Top management exercises its authority in support of environmental management accounting.					
<b>4</b>	Top management effectively communicates its support for environmental management accounting.					
<b>5</b>	Top management provides adequate resources to support the environmental management accounting adoption and implementation effort.					
<b>6</b>	Top management provides active support for environmental management accounting practices.					

**Section E: Business Strategy**

Please indicate the extent to which your firm business strategy incline to one other of each statements by ticking (✓) in the suitable box, and choose only one answer. Where: 1= strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree

	<b>We attempt to be ahead of competitors</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1</b>	By ensuring quality products rather than price.					
<b>2</b>	By introducing new products ahead of others.					
<b>3</b>	By having a wider range of products available.					
<b>4</b>	By expanding into new markets.					
<b>5</b>	By responding rapidly to new ideas in the environment.					
<b>6</b>	By adopting the latest technology regardless of costs.					
<b>7</b>	By using flexible and multiple technologies.					
<b>8</b>	By maintaining a dynamical and flexible administrative system.					
<b>9</b>	By cheaper pricing of our products.					
<b>10</b>	By focusing on improving existing products.					
<b>11</b>	By concentrating on a more limited range of products.					
<b>12</b>	By focusing on an existing stable market.					
<b>13</b>	By moving cautiously on directly relevant changes in the environment.					
<b>14</b>	By maintaining the existing cost - efficient technology.					
<b>15</b>	By using a single core technology.					
<b>16</b>	By maintaining a stable and simple administrative system.					

**Section F: Nature of Formalization**

Please indicate the extent to which you agree or disagree with the following statements, which relate to nature of rules and procedures in your firm by ticking (✓) in the suitable box of each statement, and choose only one answer. Where: 1= strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree

	<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1</b>	Your firm has written rules and procedures that show how workers can make suggestions for changes.					
<b>2</b>	Your firm has written rules and procedures that describe how workers can make changes on their job.					
<b>3</b>	Your firm has written rules and procedures that show how workers can experiment with their job.					
<b>4</b>	Your firm has written rules and procedures that guide quality improvement efforts.					
<b>5</b>	Your firm has written rules and procedures that guide creative problem solving.					
<b>6</b>	Your firm has written rules and procedures that guide performance improvement efforts.					

**Section G: Organizational culture**

Please indicate the extent to which you agree or disagree with the following statements, which relate to nature of rules and procedures in your firm by ticking (✓) in the suitable box of each statement, and choose only one answer. Where: 1= strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree

<b>C1. Dominant Characteristics</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
A	The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.					
B	The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.					
C	The organization is a very result oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.					
D	The organization is very controlled and structured place. Formal procedures generally govern what people do.					
<b>C2. Organizational Leadership</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
A	The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.					
B	The leadership in the organization is generally considered to exemplify entrepreneurship, innovating, or risk taking.					
C	The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.					
D	The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.					

<b>C3. Management Employees</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
A	The management style in the organization is considered by teamwork, consensus, and participation.					
B	The management style in the organization is considered by individual risk-taking, innovation, freedom, and uniqueness.					
C	The management style in the organization is considered by hard-driving competitiveness, high demands, and achievement.					
D	The management style in the organization is considered by security of employment, conformity, predictability, and stability in relationships.					
<b>C4. Organization Glue</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
A	The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.					
B	The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.					
C	The glue that holds the organization together is the emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes.					
D	The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.					
<b>C5. Strategic Emphases</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
A	The organization emphasizes human development. High trust, openness, and participation persist.					
B	The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.					
C	The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant.					
D	The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.					
<b>C6. Criteria of Success</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
A	The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people.					
B	The organization defines success on the basis of having the most unique or newest products. It is a product leader and innovator.					
C	The organization defines success on the basis of the winning in the marketplace and outpacing the competition. Competitive market leadership is key.					
D	The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.					

#### Section H: Coercive Pressures

Please indicate the extent to which the government, and environmental legislations encourage and oblige your firm on adoption of EMA practices, by ticking (✓) in the suitable box of each statement. Where: 1= strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree

	<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1</b>	Government provides effective initiatives to encourage and support the firm to adopt certain environmental and accounting practices to improve environmental performance.					
<b>2</b>	Government agencies such as the Environment Public Authority provides the needed guidelines that assist the firm to adopt and implement environmental management accounting.					
<b>3</b>	The government offers guidelines to encourage the firm to track environment-related costs and properly allocate to products and processes.					
<b>4</b>	The government provides educating and training programs related personnel to motivate the firm to adopt environmental management accounting.					
<b>5</b>	The government institutions such as Ministry of Industry provides financial incentives, subsidies and needed facilities to promote the firm to adopt environmental management accounting practices.					
<b>6</b>	The government institutions require the firm to provide information on environmental activities and related costs in the financial accounts.					
<b>7</b>	Government agencies monitor the firm's commitment to environmental legislation.					
<b>8</b>	The government impose strict penalties, fines when the firm violates environmental legislations.					
<b>9</b>	Environmental legislations and laws compel the firm to adopt certain techniques and practices for the environment protection.					

### **Section I: Normative Pressures**

Please indicate the extent to which the professional bodies, and formal education institutions encourage your firm on adoption of EMA practices, by ticking (✓) in the suitable box of each statement. Where: 1= strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree.

	<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1</b>	The professional bodies motivate the firm to adopt of environmental management & environmental accounting practices.					
<b>2</b>	The professional bodies provide guideline principles and needed information that help the firm on the adoption of environmental management accounting practices.					
<b>3</b>	The professional bodies effectively monitor the firm's commitment to the principles and professional standards.					
<b>4</b>	The professional bodies provide forceful support for training and education requirements to motivate the firm to adopt and implement environmental management accounting practices.					
<b>5</b>	The formal education institutions provide adequate knowledge of environmental management accounting practices.					
<b>6</b>	The formal education institutions effectively contribute to providing appropriate training courses of the firm's staff on the uses of environmental management accounting.					
<b>7</b>	The formal education institutions effectively communicate with the firm, and provide it advice to solve environmental problems that the firm may face.					

**Section J: Legitimacy Considerations**

Please indicate the extent to which you agree or disagree with the following statements which relate to legitimacy considerations of your firm, by ticking (✓) in the suitable box of each statement. Where: 1= strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree.

	<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1</b>	Your firm uses in the environmentally responsible methods to gain the support, avoid penalties and ensure legitimacy from society.					
<b>2</b>	Your firm provides information on the environmental performance to justify of its internal activities and enhance its relations with stakeholders groups in the society.					
<b>3</b>	Your firm follows public policies and rules, in order to improve its image and maintain its reputation in the society.					
<b>4</b>	Your firm reduces environmental impacts in order to avoid fines and penalties, lessen risks and satisfy employees.					
<b>5</b>	Your firm adopts and applies the organizational techniques and accounting practices in order to gain license to operate, ensure survival and achieve long-term sustainability.					

**Section K: Stakeholder pressures**

Please indicate the extent to which stakeholders encourage your firm on adoption of EMA practices, by ticking (✓) in the suitable box of each statement. Where: 1= strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree.

	<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1</b>	The stakeholders such as customers, shareholders, banks , insurance companies and suppliers threaten the firm with sanctions if it does not reduce the environmental impacts.					
<b>2</b>	The stakeholders such as government institutions promise rewards to the firm if improves its environmental behavior.					
<b>3</b>	The stakeholders such as environment interested groups , citizens remind the firm of its moral obligation towards the environment protection.					
<b>4</b>	The stakeholders encourage your firm to adopt certain techniques and practices to reduce environmental impacts and improve environmental performance.					
<b>5</b>	The stakeholders such as government, shareholders, banks , insurance companies and market stock require from your firm to provide monetary and non monetary information related to its environmental activities.					

**Thank you very much for your cooperation**

**Appendix B**

**Questionnaire**

**“Arabic Version”**



Othman Yeop Abdullah  
Graduate School of Business  
Universiti Utara Malaysia

## العوامل المؤثرة على الرغبة في تبني المحاسبة الإدارية البيئية في الشركات اليبية

### إستبيان

الباحث/ التهامي عثمان الكشر  
طالب دكتوراه بقسم المحاسبة  
كلية إدارة الأعمال / جامعة شمال ماليزيا

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## بسم الله الرحمن الرحيم

عزيزي المجيب

السلام عليكم ورحمة الله وبركاته

تحية طيبة وبعد...

من مبدأ المساهمة في معالجة القضايا المتعلقة بحماية البيئة ورفع مستوى الوعي البيئي ومساندة ومساعدة الشركات في بلادنا من أجل تحسين الأداء البيئي وتحقيق الاستدامة فإن الغرض من هذه الدراسة هو الحصول على فهم أفضل للعوامل التي قد تؤثر على تبني المحاسبة الإدارية البيئية ضمن الشركات اللبئية. حيث أن المحاسبة الإدارية البيئية أصبحت إحدى أهم الأدوات الحديثة المستخدمة من قبل الشركات في الكثير من الدول المتقدمة لدورها في تحسين الأداء المالي والبيئي.

وبناءً عليه فإن تبني المحاسبة الإدارية البيئية في الشركات اللبئية سوف يساهم في تحسين مستوى الأداء المالي والبيئي بسبب الاعتقاد بأن المعلومات التي ستقدمها المحاسبة الإدارية البيئية سوف تساعد على تحسين عمليات اتخاذ القرارات ، والحد من الآثار البيئية السلبية ، وخفض التكاليف ، وتحقيق الوفورات المالية من خلال تحديد وتصنيف التكاليف البيئية المتعلقة بالعديد من الأنشطة وتوزيعها بشكل أفضل علي المنتجات والعمليات الانتاجية با لاضافة الى تقدير الالتزامات البيئية ذات الصلة.

وبالتالي، نود منكم تخصيص جزءاً من وقتك للإجابة على الأسئلة الواردة بهذا الاستبيان ، وبما يعبر عن رأيكم الشخصي ، وإجاباتك ستكون مهمة جداً لدقة دراستي وإنجازها علي أكمل وجه. وأود أن أؤكد لكم أن جميع الإجابات التي تقدمونها سوف تبقى في سرية تامة وتستخدم فقط لأغراض البحث ولن يتم إستخدام إسمك أو إسم الشركة التي تعمل بها عندما جمع وعرض نتائج هذه الدراسة. إذا كنت ترغب في الإستفسار أو بحاجة إلى أي مساعدة في إستكمال الإستبيان، يرجى الاتصال بالباحث على العنوان المرفق ونشكركم جزيلاً علي حسن تعاونكم ومساهمتمكم.

والسلام عليكم ورحمة الله وبركاته

الباحث/ التهامي عثمان الكشر

طالب دكتوراه بقسم المحاسبة

كلية إدارة الأعمال

جامعة شمال ماليزيا

الهاتف : +60178890805

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القسم (1):- المعلومات الشخصية والتنظيمية

هذا القسم يتضمن معلومات عامة عنك وعن الشركة التي تعمل بها. الرجاء وضع علامة (✓) أمام العبارات المناسبة.

1. الجنس :  ذكر  أنثي
2. العمر :  أقل من 30 سنة  30 - 40 سنة  
 41- 50 سنة  أكثر من 50 سنة
3. المستوى التعليمي :  
 شهادة ثانوية أو ما يعادلها  بكالوريوس أو ما يعادلها  
 ماجستير  دكتوراه
4. الوظيفة :  المدير المالي/ المراقب المالي  المدير البيئي  
 أخرى .....
5. مدة عملك في هذه الوظيفة :  
 أقل من 3 سنوات  3- 5 سنوات  
 6 - 10 سنوات  أكثر من 10 سنوات
6. نشاط الشركة :  
 النفط والغاز  الصناعات الكيماوية  
 أسمنت ومواد البناء  الصناعات الغذائية  
 الصناعات الهندسية والكهربائية  صناعة الحديد والمعادن  
 صناعة الغزل والنسيج  صناعة الأثاث  
 أخرى .....
7. ملكية الشركة :  
 حكومية/عامة  خاصة  مشتركة  أخرى .....
8. عدد العاملين بالشركة :  
 أقل من 100  100- 200  201- 300  
 301- 400  401- 500  أكثر من 500

### أ. أهمية المحاسبة الإدارية البيئية

الرجاء قراءة البنود التالية بعناية، والتي تتعلق بممارسات المحاسبة الإدارية البيئية، وبيان مدى أهمية كل بند من هذه البنود لدى شركتكم بوضع علامة (✓) في المربع المناسب حيث :

					1= غير مهم على الإطلاق	2= غير مهم	3= مهم قليلاً	4= مهم	5= مهم جداً	
5	4	3	2	1	البنود					
					1	تحديد التكاليف ذات الصلة بالبيئة.				
					2	تقدير الإلتزامات ذات الصلة بالبيئة.				
					3	تصنيف التكاليف ذات الصلة بالبيئة.				
					4	تخصيص التكاليف ذات الصلة بالبيئة لعمليات الإنتاج.				
					5	تخصيص التكاليف ذات الصلة بالبيئة للمنتجات.				
					6	إدخال تحسين على إدارة التكاليف ذات الصلة بالبيئة.				
					7	إنشاء وإستخدام حسابات التكاليف ذات الصلة بالبيئة.				
					8	تطوير وإستخدام مؤشرات الأداء الرئيسية ذات الصلة بالبيئة (KPIs).				
					9	تقييم تكلفة دورة حياة المنتج.				
					10	تحليل مخزون المنتج ( تحديد أنواع وكميات المواد والطاقة المطلوبة والكميات التي يتم إطلاقها في البيئة).				
					11	تحليل أثر المنتج ( تقييم للأثر البيئي لتصاميم المنتجات المنافسة).				
					12	تحليلات تحسين المنتج ( تحديد الفرص المتاحة للحد من الأثر البيئي).				

### ب. تبني وإستخدام المحاسبة الإدارية البيئية

ب1- هل شركتكم تبنت أو أستخدمت أياً من ممارسات المحاسبة الإدارية البيئية؟

لا

نعم

**ملاحظة:\*** إذا كانت إجابتك "لا" من فضلك إذهب الى السؤال ب2

ب2- يرجى الإشارة إلى أي مدى شركتكم لديها نية أو رغبة لتبني وإدخال كل من البنود التالية والمتعلقة بممارسات ممارسات المحاسبة الإدارية البيئية بوضع علامة (✓) في المربع المناسب حيث :

					1= لا رغبة علي الإطلاق	2= لا رغبة	3= محايد	4= لديها رغبة	5= رغبة إلى حد كبير	
5	4	3	2	1	البنود					
					1	تحديد التكاليف ذات الصلة بالبيئة.				
					2	تقييم الإلتزامات ذات الصلة بالبيئة.				
					3	تصنيف التكاليف ذات الصلة بالبيئة.				
					4	تخصيص التكاليف ذات الصلة بالبيئة لعمليات الإنتاج.				
					5	تخصيص التكاليف ذات الصلة بالبيئة للمنتجات.				
					6	إدخال تحسين على إدارة التكاليف ذات الصلة بالبيئة.				
					7	إنشاء وإستخدام حسابات التكاليف ذات الصلة بالبيئة.				
					8	تطوير وإستخدام مؤشرات الأداء الرئيسية ذات الصلة بالبيئة (KPIs).				
					9	تقييم تكلفة دورة حياة المنتج.				

10	تحليل مخزون المنتج (تحديد أنواع وكميات المواد والطاقة المطلوبة والكميات التي يتم إطلاقها في البيئة).				
11	تحليل أثر المنتج (تقييم للأثر البيئي لتصاميم المنتجات المنافسة).				
12	تحليل تحسين المنتج (تحديد الفرص المتاحة للحد من الأثر البيئي).				

### القسم (3):- الفوائد المتصورة

الشركة التي تعمل بها تردك الفوائد من تبني المحاسبة الإدارية البيئية. الرجاء قراءة العبارات التالية بعناية ، ومن ثم الإجابة عما إذا كنت توافق أو لا توافق على العبارة بوضع علامة (✓) في العمود المناسب حيث :

5	4	3	2	1	البنود
					1 زيادة الطلب على المنتجات الصديقة أو غير الضارة للبيئة.
					2 زيادة هوامش الربح للمنتج.
					3 زيادة رضا العملاء.
					4 تخفيض تكلفة رأس المال.
					5 تخفيض تكاليف التأمين.
					6 تخفيض تكاليف التشغيل.
					7 التعرف على فرص جديدة.
					8 إنشاء أو توليد إبتكار في العملية الانتاجية.
					9 إنشاء أو توليد إبتكار في المنتج.
					10 جذب الموظفين الأفضل جودة.
					11 تحسن في الإنتاجية.
					12 تحسن في سمعة الشركة.
					13 تحسن في صنع القرار.
					14 تحسين تكلفة المنتج.
					15 تحسين عملية الإنتاج.

### القسم (4):- دعم الإدارة العليا

الرجاء قراءة العبارات التالية بعناية ، والإشارة إلى أي مدى الادارة العليا تؤيد و تدعم تبني وتطبيق ممارسات المحاسبة الإدارية البيئية في الشركة التي تعمل بها بوضع علامة (✓) في العمود المناسب لكل عبارة حيث :

5	4	3	2	1	العبارة
					1 الإدارة العليا مهتمة بتبني وتطبيق المحاسبة الإدارية البيئية.
					2 الإدارة العليا تعتبر أن ممارسات المحاسبة الإدارية البيئية هامة للشركة.
					3 الإدارة العليا تمارس سلطتها لدعم المحاسبة الإدارية البيئية.
					4 الإدارة العليا تواصل بفاعلية دعمها للمحاسبة الإدارية البيئية.
					5 الإدارة العليا تقدم الموارد الكافية لدعم جهود تبني وتطبيق المحاسبة الإدارية البيئية.
					6 الإدارة العليا توفر الدعم الفعال لممارسات المحاسبة الإدارية البيئية.

القسم (5) :- إستراتيجية الشركة

الرجاء الإشارة إلى أي مدى إستراتيجية الشركة التي تعمل بها تتوافق مع أو تميل إلى كل واحدة من الجمل التالية بوضع علامة (✓) في العمود المناسب لكل عبارة حيث :

1= لا أوافق بشدة	2= لا أوافق	3= محايد	4= أوافق	5= أوافق بشدة
------------------	-------------	----------	----------	---------------

5	4	3	2	1	نحن نحاول أن نكون في مقدمة المنافسين
					1 من خلال التركيز علي منتجات ذات جودة عالية بدلا من السعر.
					2 من خلال طرح منتجات جديدة قبل الآخرين.
					3 من خلال وجود مجموعة واسعة من المنتجات المتاحة.
					4 عن طريق التوسع في أسواق جديدة.
					5 من خلال الاستجابة السريعة للأفكار الجديدة في البيئة المحيطة.
					6 من خلال اعتماد أحدث التقنيات بغض النظر عن التكاليف.
					7 باستخدام تقنيات مرنة ومتعددة.
					8 من خلال المحافظة على نظام إداري ديناميكي ومرن.
					9 من خلال الأسعار الأرخص لمنتجاتنا.
					10 من خلال التركيز على تحسين المنتجات الحالية.
					11 من خلال التركيز أكثر على مجموعة محدودة من المنتجات.
					12 من خلال التركيز على السوق الحالي والمستقر.
					13 عن طريق التحرك بحذر بشأن التغييرات ذات الصلة المباشرة بالبيئة.
					14 من خلال الحفاظ على التكنولوجيا الحالية فعالة من حيث التكلفة.
					15 عن طريق استخدام تكنولوجيا أساسية وحيدة.
					16 من خلال المحافظة على نظام إداري مستقر وبسيط.

القسم (6) :- طبيعة الهيكل التنظيمي

الرجاء قراءة العبارات التالية بعناية ، والتي تتعلق بطبيعة القواعد والإجراءات المعمول بها في الشركة التي تعمل بها ، ومن تم الإجابة عما إذا كنت توافق أو لا توافق علي العبارة بوضع علامة (✓) في العمود المناسب حيث :

1= لا أوافق بشدة	2= لا أوافق	3= محايد	4= أوافق	5= أوافق بشدة
------------------	-------------	----------	----------	---------------

5	4	3	2	1	العبارة
					1 الشركة لديها القواعد والإجراءات المكتوبة التي تبين كيف يمكن للعمال تقديم مقترحات لإجراء تغييرات.
					2 الشركة لديها القواعد والإجراءات المكتوبة التي تصف كيف يمكن للعمال إجراء تغييرات على وظائفهم.
					3 الشركة لديها القواعد والإجراءات المكتوبة التي تبين كيف يمكن تجريب العمال مع وظائفهم.
					4 الشركة لديها القواعد والإجراءات المكتوبة التي تقود الجهود إلي تحسين الجودة.
					5 الشركة لديها القواعد والإجراءات المكتوبة التي تقود إلي إيجاد الحلول للمشاكل.
					6 الشركة لديها القواعد والإجراءات المكتوبة التي تقود الجهود إلي تحسين الأداء.

القسم (7) :- ثقافة أو بيئة الشركة

الرجاء قراءة العبارات التالية بعناية ، والتي تتعلق بطبيعة القواعد والإجراءات المعمول بها في الشركة التي تعمل بها ، ومن تم الإجابة عما إذا كنت توافق أو لا توافق علي العبارة وذلك بوضع علامة (✓) في العمود المناسب حيث :

1= لا أوافق بشدة	2= لا أوافق	3= محايد	4= أوافق	5= أوافق بشدة
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1.ج - الصفات المهيمنة على المنظمة :						
5	4	3	2	1		
					أ	المنظمة يسودها الطابع الشخصي، وهي مثل الاسرة الواحدة والأفراد فيها متعاونون ومشتركون في كثير من الصفات العامة بينهم.
					ب	المنظمة نشطة وحركية ، والموظفون بها مستعدون للمغامرة والخوض في المخاطر والمنافسات في مجال العمل.
					ج	المنظمة هي من النوع الذي يركز على النتائج، والقلق الرئيسي داخل المنظمة هو إنجاز الأعمال والموظفون متنافسون جدا.
					د	المنظمة هي عبارة عن مركز محكم ومنظم جدا ، والموظفون يتبعون الإجراءات الرسمية دائماً وتحكم الإجراءات الرسمية ما يعمل الموظفون بوجه عام.
2.ج - نوعية القيادة داخل المنظمة :						
5	4	3	2	1		
					أ	القيادات في المنظمة تعتبر بوجه عام تميل إلى الإرشاد والتسهيل.
					ب	القيادات في المنظمة تعتبر بوجه عام تميل إلى العمل الحر و الإستحداث والتطوير وتحمل المخاطرة .
					ج	القيادات في المنظمة تعتبر بوجه عام تميل إلى الجدية في العمل وذات طابع جدي وتهتم بالنتائج في العمل.
					د	القيادات في المنظمة تعتبر بوجه عام تميل إلى التعاون وتنظيم العمل والإهتمام بأداء العمل بكفاءة وفعالية.
3.ج - إدارة الموظفين داخل المنظمة :						
5	4	3	2	1		
					أ	أسلوب الإدارة في المنظمة يتميز بعمل الفريق والإجماع والمشاركة .
					ب	أسلوب الإدارة في المنظمة يتميز بالمخاطرة الفردية والإبتكار والحرية والتميز.
					ج	أسلوب الإدارة في المنظمة يتميز بمنافسة صارمة، الطلبات المتكررة والنجاح.
					د	أسلوب الإدارة في المنظمة يتميز بتأمين الوظيفة ، الإلتزام ، التنبؤ، الإستقرار في العلاقة.
4.ج - الرابطة داخل المنظمة :						
5	4	3	2	1		
					أ	الرابطة التي تتميز وتسيطر بهذه المنظمة والتي تساهم في ترابطها معاً هي الإخلاص والصدق المتبادل يرتقي بهذه المنظمة إلى الأعلى.
					ب	الرابطة التي تتميز وتسيطر بهذه المنظمة والتي تساهم في ترابطها معاً هي الإلتزام بالإبتكار والتطوير ، وهناك التشديد على المنافسة والتحديات الجديدة.
					ج	الرابطة التي تتميز وتسيطر بهذه المنظمة والتي تساهم في ترابطها معاً هي التشديد على إنجاز الأعمال ، والوصول للهدف بجدية وصرامة تامة والفوز.
					د	الرابطة التي تتميز وتسيطر بهذه المنظمة والتي تساهم في ترابطها معاً هي القواعد والسياسات والعلاقات الرسمية والمحافظة علي دوران انسيابي مهم.
5.ج - الإهتمام الإستراتيجي داخل المنظمة :						
5	4	3	2	1		
					أ	تهتم وتشدد المنظمة على التنمية البشرية والثقة العالية والإنتحاح والمشاركة.
					ب	تهتم وتشدد المنظمة على الموارد الجديدة و الحديثة وخلق تحديات والتغيب عن الفرص.

					ج	تهتم وتشدد المنظمة على الأعمال التنافسية و الإنجاز وبلوغ أهداف الإمتداد والفوز بمكان مهيمن في السوق.
					د	تهتم وتشدد المنظمة على الدوام والإستقرار والفعالية ، والسيطرة والعمليات البسيطة المهمة.
					<b>6. ج - معايير النجاح في المنظمة :</b>	
				1	أ	تُعرف المنظمة النجاح على أساس تطوير الموارد البشرية والعمل الجماعي والتزام الموظف ، والحرص علي موظفي المنظمة.
				2	ب	تُعرف المنظمة النجاح على أساس تملك منتجات فريدة و جديدة ، وإنها سبابة للإبداع والإنتاج.
				3	ج	تُعرف المنظمة النجاح على أساس الفوز في السوق وسبق المنافسة وسياسة وقيادة التسويق والتحديات التنافسية أساسية.
				4	د	تُعرف المنظمة النجاح على أساس الفعالية والتسليم الجدير بالثقة والتخطيط الإنسيابي وإنتقاد التكلفة المنخفضة للإنتاج .
				5		

#### القسم (8):- ضغوط الحكومة والتشريعات البيئية

الرجاء قراءة العبارات التالية بعناية والإشارة إلى أي مدى تقوم الحكومة والتشريعات البيئية بتشجيع وحث الشركة التي تعمل بها على تبني ممارسات المحاسبة الإدارية البيئية، وذلك بوضع علامة (✓) في العمود المناسب لكل عبارة حيث :

1= لا أوافق بشدة	2= لا أوافق	3= محايد	4= أوافق	5= أوافق بشدة
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5	4	3	2	1	العبارة
					1 الحكومة تقدم مبادرات فعالة تدعم وتشجع الشركة على تبني ممارسات بيئية ومحاسبية معينة من أجل تحسين الأداء البيئي.
					2 المؤسسات الحكومية مثل الهيئة العامة للبيئة توفر المبادئ التوجيهية اللازمة التي تساعد الشركة على تبني وتطبيق نظم وممارسات المحاسبة الإدارية البيئية.
					3 الحكومة تقدم مبادئ توجيهية لتشجيع الشركات على تعقب التكاليف ذات الصلة بالبيئة وتخصيصها بشكل صحيح علي المنتجات والعمليات .
					4 الحكومة توفر البرامج التعليمية والتدريبية المتعلقة بالأفراد لتحفيز الشركة على إعتقاد ممارسات المحاسبة الإدارية البيئية ضمن نظامها المالي و الإداري.
					5 الجهات الحكومية مثل وزارة الصناعة تقدم الحوافز المالية، والإعانات والتسهيلات اللازمة لتشجيع الشركة على تبني ممارسات المحاسبة الإدارية البيئية.
					6 المؤسسات الحكومية تطلب من الشركة أن توفر لها معلومات عن الأنشطة البيئية في الحسابات والقوائم المالية.
					7 الجهات الحكومية تراقب التزام الشركة بالتشريعات والقوانين البيئية
					8 الحكومة تفرض عقوبات صارمة وغرامات مالية كبيرة علي الشركة عندما تخالف التشريعات البيئية.
					9 التشريعات والقوانين البيئية (مثل قانون حماية البيئة رقم 15 لسنة 2003) تحتم على الشركة تبني تقنيات وممارسات معينة لحماية البيئة.

القسم (9):- ضغوط المنظمات المهنية والمؤسسات التعليمية

الرجاء قراءة العبارات التالية بعناية والإشارة إلى أي مدى المنظمات المهنية و المؤسسات التعليمية تقوم بتشجيع وحث الشركة التي تعمل بها على تبني ممارسات المحاسبة الإدارية البيئية، وذلك بوضع علامة (✓) في العمود المناسب لكل عبارة حيث :

1= لا أوافق بشدة	2= لا أوافق	3= محايد	4= أوافق	5= أوافق بشدة
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5	4	3	2	1	العبارة
					1 المنظمات المهنية تحفز الشركة على اعتماد ممارسات الإدارة البيئية والمحاسبة البيئية.
					2 المنظمات المهنية توفر المبادئ التوجيهية والمعايير اللازمة لتعزيز عملية اعتماد ممارسات المحاسبة الإدارية البيئية وبيان كيفية استخدامها.
					3 المنظمات المهنية ترافق بشكل فعال التزام الشركة بالمبادئ والمعايير المهنية.
					4 المنظمات المهنية تقدم دعماً قوياً لمتطلبات التدريب والتعليم لتحفيز الشركة على تبني وتنفيذ ممارسات المحاسبة الإدارية البيئية.
					5 مؤسسات التعليم الرسمي توفر معرفة كافية حول المحاسبة الإدارية البيئية.
					6 مؤسسات التعليم الرسمي تساهم بشكل فعال في تقديم دورات تدريبية مناسبة لموظفي الشركة للتعريف باستخدامات المحاسبة الإدارية البيئية وفوائدها.
					7 مؤسسات التعليم الرسمي تتواصل بشكل فعال مع الشركة ، وتقدم لها المشورة لحل المشاكل البيئية التي قد تتعرض لها.

القسم (10):- الإعتبارات الشرعية

الرجاء قراءة العبارات التالية بعناية والمتعلقة بالإعتبارات الشرعية لدى الشركة التي تعمل بها ، ومن تم الإجابة عما إذا كنت توافق أو لا توافق علي كل عبارة وذلك بوضع علامة (✓) في العمود المناسب. حيث :

1= لا أوافق بشدة	2= لا أوافق	3= محايد	4= أوافق	5= أوافق بشدة
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5	4	3	2	1	العبارة
					1 الشركة تسعى للعمل بطريقة مسؤولة بيئياً من أجل الحصول على التأييد، وتجنب العقوبات وضمان الشرعية من قبل المجتمع.
					2 الشركة تقدم معلومات عن الأداء البيئي لتبرير أنشطتها الداخلية وتعزيز علاقاتها مع مجموعات أصحاب المصالح في المجتمع.
					3 الشركة تتبع السياسات والقواعد العامة ، من أجل تحسين صورتها والحفاظ على سمعتها في المجتمع.
					4 الشركة تسعى للحد من التأثيرات البيئية من أجل تجنب الغرامات و تقليل المخاطر وإرضاء الموظفين.
					5 الشركة تسعى الى تبني وتطبيق التقنيات التنظيمية والممارسات المحاسبية من أجل الحصول على رخصة للعمل، وضمان البقاء ، وتحقيق الاستدامة على المدى الطويل.

القسم (11):- ضغوط أصحاب المصالح

الرجاء قراءة العبارات التالية بعناية والإشارة إلى أي مدى أصحاب المصالح يقومون بتشجيع وحث الشركة التي تعمل بها على تبني ممارسات المحاسبة الإدارية وذلك بوضع علامة (✓) في العمود المناسب لكل عبارة حيث :

1= لا أوافق بشدة	2= لا أوافق	3= محايد	4= أوافق	5= أوافق بشدة
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5	4	3	2	1	العبارة
					1 أصحاب المصالح مثل الزبائن والمساهمين والبنوك وشركات التأمين والموردين يهددون شركة بفرض عقوبات عليها إذا لم تُقلل من التأثيرات البيئية.
					2 الجهات المعنية مثل المؤسسات الحكومية تقدم مكافآت للشركة لحثها على تحسين سلوكها البيئي.
					3 أصحاب المصالح مثل الجماعات المهتمة بالبيئة والمواطنين يقومون بتذكير الشركة بالتزامها الأخلاقي تجاه حماية البيئة.
					4 أصحاب المصالح يمارسون ضغوطاً كبيرة لحث الشركة على تبني التقنيات والممارسات التي تساعد على الحد من الآثار البيئية وتحسين الأداء البيئي.
					5 الجهات المعنية مثل الحكومة والمساهمين والبنوك وشركات التأمين تضغط بقوة على الشركة من أجل توفير معلومات كمية ونقدية على الأنشطة البيئية.

نشكركم جزيلاً على تعاونكم معنا، والسلام عليكم



**Appendix C**  
**Results of T test**

**T test for non-response bias**

**Group Statistics**

	Response Time	N	Mean	Std. Deviation	Std. Error Mean
PIEMA	Early	134	3.49	.864	.075
	Later	68	3.65	.817	.099
ITAEMA	Early	134	3.37	.838	.072
	Later	68	3.34	.905	.110
PBEMA	Early	134	3.55	.839	.072
	Later	68	3.62	.815	.099
TMS	Early	134	3.36	.857	.074
	Later	68	3.43	.872	.106
PS	Early	134	3.35	.813	.070
	Later	68	3.42	.889	.108
DS	Early	134	3.44	.693	.060
	Later	68	3.60	.793	.096
NF	Early	134	3.30	.916	.079
	Later	68	3.21	.797	.097
Clan	Early	134	3.50	.908	.078
	Later	68	3.65	.903	.109
Adhocracy	Early	134	2.85	1.039	.090
	Later	68	2.77	1.101	.134
Market	Early	134	3.58	.978	.084
	Later	68	3.50	.902	.109
Hierarchy	Early	134	4.28	.830	.072
	Later	68	4.10	.824	.100
CP	Early	134	3.06	.925	.080
	Later	68	3.13	.862	.105
NP	Early	134	3.07	.900	.078
	Later	68	3.17	.969	.117
LC	Early	134	3.31	.785	.068
	Later	68	3.28	.781	.095
SP	Early	134	3.13	.969	.084
	Later	68	2.86	.960	.116

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error
PIEMA	Equal variances assumed	.397	.530	-1.282	200	.201	-.162	.126
	Equal variances not assumed			-1.305	141.634	.194	-.162	.124
ITAEMA	Equal variances assumed	1.833	.177	.181	200	.857	.023	.128
	Equal variances not assumed			.176	125.922	.861	.023	.131
PBEMA	Equal variances assumed	.709	.401	-.533	200	.595	-.066	.124
	Equal variances not assumed			-.538	138.185	.592	-.066	.123

TMS	Equal variances assumed	.041	.840	-.589	200	.556	-.076	.128
	Equal variances not assumed			-.586	132.719	.559	-.076	.129
PS	Equal variances assumed	1.169	.281	-.591	200	.555	-.074	.125
	Equal variances not assumed			-.575	124.732	.567	-.074	.129
DS	Equal variances assumed	2.194	.140	-1.459	200	.146	-.158	.108
	Equal variances not assumed			-1.395	119.835	.165	-.158	.113
NF	Equal variances assumed	1.872	.173	.700	200	.485	.091	.131
	Equal variances not assumed			.733	152.372	.465	.091	.125
Clan	Equal variances assumed	.262	.609	-1.163	200	.246	-.157	.135
	Equal variances not assumed			-1.165	135.508	.246	-.157	.135
Adhocracy	Equal variances assumed	1.147	.286	.483	200	.630	.076	.158
	Equal variances not assumed			.474	128.009	.636	.076	.161
Market	Equal variances assumed	1.143	.286	.570	200	.570	.081	.142
	Equal variances not assumed			.585	144.760	.560	.081	.138
Hierarchy	Equal variances assumed	.127	.722	1.484	200	.139	.183	.123
	Equal variances not assumed			1.488	135.627	.139	.183	.123
CP	Equal variances assumed	1.187	.277	-.550	200	.583	-.074	.135
	Equal variances not assumed			-.563	143.494	.575	-.074	.132
NP	Equal variances assumed	1.206	.274	-.749	200	.455	-.103	.138
	Equal variances not assumed			-.731	126.382	.466	-.103	.141
LC	Equal variances assumed	.204	.652	.267	200	.790	.031	.117
	Equal variances not assumed			.268	135.365	.789	.031	.116
SP	Equal variances assumed	.539	.464	1.863	200	.064	.268	.144
	Equal variances not assumed			1.869	135.936	.064	.268	.143

## T test for Gender

### Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
PIEMA	M	176	3.55	.864	.065
	F	26	3.54	.763	.150
ITAEMA	M	176	3.37	.855	.064
	F	26	3.28	.898	.176
PBEMA	M	176	3.58	.831	.063

TMS	F	26	3.50	.833	.163
	M	176	3.41	.882	.066
PS	F	26	3.21	.689	.135
	M	176	3.37	.841	.063
DS	F	26	3.41	.832	.163
	M	176	3.50	.734	.055
NF	F	26	3.41	.711	.139
	M	176	3.28	.890	.067
Clan	F	26	3.25	.795	.156
	M	176	3.56	.885	.067
Adhocracy	F	26	3.45	1.061	.208
	M	176	2.80	1.039	.078
Market	F	26	2.96	1.194	.234
	M	176	3.57	.925	.070
Hierarchy	F	26	3.42	1.128	.221
	M	176	4.21	.830	.063
CP	F	26	4.23	.851	.167
	M	176	3.10	.892	.067
NP	F	26	2.96	.983	.193
	M	176	3.12	.915	.069
LC	F	26	3.01	.986	.193
	M	176	3.30	.785	.059
SP	F	26	3.32	.773	.152
	M	176	3.04	.994	.075
	F	26	2.99	.826	.162

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error
PIEMA	Equal variances assumed	1.040	.309	.068	200	.946	.012	.179
	Equal variances not assumed			.074	35.181	.941	.012	.163
ITAEMA	Equal variances assumed	.051	.822	.498	200	.619	.090	.181
	Equal variances not assumed			.480	32.054	.635	.090	.188
PBEMA	Equal variances assumed	.100	.752	.456	200	.649	.080	.175
	Equal variances not assumed			.455	32.793	.652	.080	.175
TMS	Equal variances assumed	3.876	.050	1.077	200	.283	.195	.181
	Equal variances not assumed			1.293	38.260	.204	.195	.151
PS	Equal variances assumed	.031	.860	-.258	200	.797	-.046	.176
	Equal variances not assumed			-.260	33.011	.796	-.046	.175
DS	Equal variances assumed	.044	.834	.577	200	.564	.089	.154
	Equal variances not assumed			.591	33.364	.559	.089	.150
NF	Equal variances assumed	1.210	.273	.149	200	.882	.027	.185
	Equal variances not assumed			.162	34.947	.872	.027	.170
Clan	Equal variances assumed	2.625	.107	.596	200	.552	.114	.191

	Equal variances not assumed			.521	30.352	.606	.114	.219
Adhocracy	Equal variances assumed	2.323	.129	-.704	200	.483	-.157	.223
	Equal variances not assumed			-.634	30.851	.530	-.157	.247
Market	Equal variances assumed	2.858	.092	.785	200	.433	.157	.200
	Equal variances not assumed			.678	30.173	.503	.157	.232
Hierarchy	Equal variances assumed	.054	.816	-.090	200	.928	-.016	.175
	Equal variances not assumed			-.089	32.424	.930	-.016	.178
CP	Equal variances assumed	.529	.468	.735	200	.463	.140	.190
	Equal variances not assumed			.684	31.392	.499	.140	.204
NP	Equal variances assumed	.607	.437	.582	200	.561	.113	.194
	Equal variances not assumed			.550	31.696	.586	.113	.205
LC	Equal variances assumed	.443	.506	-.115	200	.909	-.019	.165
	Equal variances not assumed			-.116	33.095	.908	-.019	.163
SP	Equal variances assumed	2.725	.100	.242	200	.809	.050	.205
	Equal variances not assumed			.277	36.584	.783	.050	.179

## T test for Respondents Function

### Group Statistics

	Function	N	Mean	Std. Deviation	Std. Error Mean
PIEMA	Financial Director	128	3.58	.834	.074
	Environmental Manager	74	3.49	.880	.102
ITAEMA	Financial Director	128	3.37	.860	.076
	Environmental Manager	74	3.33	.862	.100
PBEMA	Financial Director	128	3.58	.773	.068
	Environmental Manager	74	3.56	.924	.107
TMS	Financial Director	128	3.44	.840	.074
	Environmental Manager	74	3.28	.892	.104
PS	Financial Director	128	3.43	.837	.074
	Environmental Manager	74	3.28	.838	.097
DS	Financial Director	128	3.55	.710	.063
	Environmental Manager	74	3.38	.755	.088
NF	Financial Director	128	3.31	.848	.075
	Environmental Manager	74	3.20	.926	.108
Clan	Financial Director	128	3.57	.926	.082
	Environmental Manager	74	3.52	.879	.102
Adhocracy	Financial Director	128	2.75	1.041	.092
	Environmental Manager	74	2.95	1.082	.126
Market	Financial Director	128	3.54	.936	.083
	Environmental Manager	74	3.58	.984	.114
Hierarchy	Financial Director	128	4.21	.829	.073
	Environmental Manager	74	4.23	.838	.097
CP	Financial Director	128	3.10	.895	.079
	Environmental Manager	74	3.05	.923	.107

NP	Financial Director	128	3.12	.909	.080
	Environmental Manager	74	3.07	.952	.111
LC	Financial Director	128	3.32	.789	.070
	Environmental Manager	74	3.27	.773	.090
SP	Financial Director	128	3.05	1.001	.088
	Environmental Manager	74	3.01	.927	.108

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error
PIEMA	Equal variances assumed	.355	.552	.739	200	.461	.092	.124
	Equal variances not assumed			.728	145.849	.468	.092	.126
ITAEMA	Equal variances assumed	.078	.781	.357	200	.721	.045	.126
	Equal variances not assumed			.357	152.220	.722	.045	.126
PBEMA	Equal variances assumed	5.013	.026	.104	200	.917	.013	.121
	Equal variances not assumed			.099	131.590	.921	.013	.127
TMS	Equal variances assumed	.007	.933	1.28	200	.202	.161	.126
	Equal variances not assumed			1.26	145.070	.209	.161	.128
PS	Equal variances assumed	.383	.537	1.22	200	.221	.150	.122
	Equal variances not assumed			1.22	152.376	.222	.150	.122
DS	Equal variances assumed	.276	.600	1.64	200	.102	.175	.106
	Equal variances not assumed			1.61	144.986	.108	.175	.108
NF	Equal variances assumed	2.105	.148	.850	200	.396	.109	.128
	Equal variances not assumed			.830	141.752	.408	.109	.131
Clan	Equal variances assumed	.368	.545	.381	200	.703	.051	.133
	Equal variances not assumed			.387	158.998	.699	.051	.131
Adhocracy	Equal variances assumed	.327	.568	1.32	200	.185	-.205	.154
	Equal variances not assumed			1.31	147.714	.190	-.205	.156
Market	Equal variances assumed	.592	.442	-.312	200	.755	-.043	.139
	Equal variances not assumed			-.308	146.276	.759	-.043	.141
Hierarchy	Equal variances assumed	.334	.564	-.165	200	.869	-.020	.122
	Equal variances not assumed			-.165	151.142	.869	-.020	.122
CP	Equal variances assumed	.305	.581	.348	200	.728	.046	.132

	Equal variances not assumed			.346	148.630	.730	.046	.133
NP	Equal variances assumed	1.098	.296	.380	200	.704	.051	.135
	Equal variances not assumed			.375	146.751	.708	.051	.137
LC	Equal variances assumed	.198	.657	.449	200	.654	.051	.114
	Equal variances not assumed			.452	155.136	.652	.051	.114
SP	Equal variances assumed	.174	.677	.270	200	.788	.038	.142
	Equal variances not assumed			.275	162.255	.783	.038	.139

**Appendix D**  
**Results of One-Way Analysis of Variance**

**Age**

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	
					Lower Bound	Upper Bound			
PIEMA	<30 years old	13	3.34	.797	.221	2.86	3.82	2	4
	30-40 years old	67	3.45	.807	.099	3.25	3.64	2	5
	41-50 years old	72	3.65	.860	.101	3.44	3.85	2	5
	>50 years old	50	3.59	.903	.128	3.33	3.84	2	5
	Total	202	3.55	.850	.060	3.43	3.66	2	5
ITAEMA	<30 years old	13	3.30	.657	.182	2.90	3.70	2	4
	30-40 years old	67	3.26	.870	.106	3.05	3.48	2	5
	41-50 years old	72	3.39	.903	.106	3.18	3.60	2	5
	>50 years old	50	3.45	.834	.118	3.21	3.69	2	5
	Total	202	3.36	.859	.060	3.24	3.48	2	5
PBEMA	<30 years old	13	3.56	.712	.197	3.13	3.99	2	4
	30-40 years old	67	3.42	.807	.099	3.23	3.62	2	5
	41-50 years old	72	3.63	.922	.109	3.41	3.85	2	5
	>50 years old	50	3.69	.735	.104	3.48	3.90	2	5
	Total	202	3.57	.829	.058	3.46	3.69	2	5
TMS	<30 years old	13	3.31	.833	.231	2.80	3.81	2	5
	30-40 years old	67	3.30	.872	.107	3.09	3.51	2	5
	41-50 years old	72	3.36	.924	.109	3.14	3.58	2	5
	>50 years old	50	3.54	.756	.107	3.33	3.75	2	5
	Total	202	3.38	.861	.061	3.26	3.50	2	5
PS	<30 years old	13	3.48	.875	.243	2.95	4.01	2	5
	30-40 years old	67	3.29	.858	.105	3.08	3.50	2	5
	41-50 years old	72	3.37	.801	.094	3.18	3.56	2	5
	>50 years old	50	3.46	.866	.123	3.22	3.71	2	5
	Total	202	3.37	.838	.059	3.26	3.49	2	5
DS	<30 years old	13	3.48	.694	.192	3.06	3.90	2	5
	30-40 years old	67	3.44	.699	.085	3.27	3.61	2	5
	41-50 years old	72	3.48	.774	.091	3.30	3.67	2	5
	>50 years old	50	3.58	.728	.103	3.37	3.78	2	5
	Total	202	3.49	.730	.051	3.39	3.59	2	5
NF	<30 years old	13	3.10	.686	.190	2.69	3.52	2	4
	30-40 years old	67	3.18	.863	.105	2.97	3.39	2	5
	41-50 years old	72	3.37	.907	.107	3.16	3.58	2	5
	>50 years old	50	3.30	.898	.127	3.04	3.56	2	5
	Total	202	3.27	.876	.062	3.15	3.40	2	5
Clan	<30 years old	13	3.37	.694	.193	2.95	3.79	2	4
	30-40 years old	67	3.63	.922	.113	3.40	3.85	2	5
	41-50 years old	72	3.42	.938	.111	3.20	3.64	2	5
	>50 years old	50	3.67	.882	.125	3.42	3.92	2	5
	Total	202	3.55	.907	.064	3.42	3.67	2	5
Adhocrac y	<30 years old	13	2.56	.934	.259	2.00	3.13	1	4
	30-40 years old	67	2.78	1.093	.134	2.51	3.04	1	5
	41-50 years old	72	2.82	.981	.116	2.59	3.05	1	5
	>50 years old	50	2.96	1.155	.163	2.63	3.29	1	5
	Total	202	2.83	1.058	.074	2.68	2.97	1	5
Market	<30 years old	13	3.62	.818	.227	3.12	4.11	2	5
	30-40 years old	67	3.35	.974	.119	3.12	3.59	2	5
	41-50 years old	72	3.61	.951	.112	3.39	3.83	2	5
	>50 years old	50	3.72	.935	.132	3.46	3.99	2	5
	Total	202	3.55	.952	.067	3.42	3.69	2	5
Hierarchy	<30 years old	13	4.46	.834	.231	3.96	4.97	3	5
	30-40 years old	67	4.27	.802	.098	4.07	4.46	2	5

	41-50 years old	72	4.15	.826	.097	3.95	4.34	2	5
	>50 years old	50	4.19	.881	.125	3.94	4.44	3	5
	Total	202	4.22	.831	.058	4.10	4.33	2	5
	<30 years old	13	3.03	.934	.259	2.46	3.59	2	4
	30-40 years old	67	2.94	.910	.111	2.72	3.16	1	5
CP	41-50 years old	72	3.16	.865	.102	2.95	3.36	1	5
	>50 years old	50	3.18	.940	.133	2.92	3.45	1	5
	Total	202	3.08	.903	.064	2.96	3.21	1	5
	<30 years old	13	3.04	.815	.226	2.55	3.54	2	4
	30-40 years old	67	2.99	.895	.109	2.77	3.21	1	5
NP	41-50 years old	72	3.14	.966	.114	2.92	3.37	1	5
	>50 years old	50	3.22	.929	.131	2.95	3.48	1	5
	Total	202	3.10	.923	.065	2.98	3.23	1	5
	<30 years old	13	3.00	.643	.178	2.61	3.39	2	4
	30-40 years old	67	3.28	.797	.097	3.08	3.47	2	5
LC	41-50 years old	72	3.33	.789	.093	3.15	3.52	2	5
	>50 years old	50	3.37	.786	.111	3.14	3.59	2	5
	Total	202	3.30	.782	.055	3.19	3.41	2	5
	<30 years old	13	2.86	.802	.222	2.38	3.35	1	4
	30-40 years old	67	2.87	1.045	.128	2.61	3.12	1	5
SP	41-50 years old	72	3.07	.909	.107	2.86	3.29	1	5
	>50 years old	50	3.26	.976	.138	2.98	3.53	1	5
	Total	202	3.04	.972	.068	2.90	3.17	1	5

#### Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
PIEMA	.283	3	198	.838
ITAEMA	.538	3	198	.657
PBEMA	1.939	3	198	.124
TMS	1.141	3	198	.334
PS	.413	3	198	.744
DS	.195	3	198	.899
NF	.546	3	198	.652
Clan	.765	3	198	.515
Adhocracy	1.411	3	198	.241
Market	.463	3	198	.708
Hierarchy	.723	3	198	.539
CP	.236	3	198	.871
NP	.595	3	198	.619
LC	.778	3	198	.508
SP	.993	3	198	.397

#### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	2.033	3	.678	.938	.423
PIEMA	Within Groups	143.120	198	.723		
	Total	145.153	201			
	Between Groups	1.135	3	.378	.509	.676
ITAEMA	Within Groups	147.041	198	.743		
	Total	148.176	201			
	Between Groups	2.380	3	.793	1.156	.328
PBEMA	Within Groups	135.901	198	.686		
	Total	138.281	201			
	Between Groups	1.818	3	.606	.816	.487
TMS	Within Groups	147.108	198	.743		
	Total	148.926	201			
	Between Groups	1.002	3	.334	.472	.702
PS	Within Groups	140.154	198	.708		
	Total	141.156	201			
DS	Between Groups	.556	3	.185	.344	.793



	Within Groups	106.536	198	.538			
	Total	107.092	201				
NF	Between Groups	1.626	3	.542	.703	.552	
	Within Groups	152.772	198	.772			
	Total	154.398	201				
Clan	Between Groups	2.874	3	.958	1.167	.323	
	Within Groups	162.552	198	.821			
	Total	165.426	201				
Adhocracy	Between Groups	1.956	3	.652	.579	.630	
	Within Groups	223.086	198	1.127			
	Total	225.042	201				
Market	Between Groups	4.356	3	1.452	1.618	.186	
	Within Groups	177.686	198	.897			
	Total	182.042	201				
Hierarchy	Between Groups	1.367	3	.456	.657	.579	
	Within Groups	137.316	198	.694			
	Total	138.683	201				
CP	Between Groups	2.309	3	.770	.943	.421	
	Within Groups	161.596	198	.816			
	Total	163.905	201				
NP	Between Groups	1.721	3	.574	.670	.571	
	Within Groups	169.463	198	.856			
	Total	171.184	201				
LC	Between Groups	1.514	3	.505	.824	.482	
	Within Groups	121.325	198	.613			
	Total	122.839	201				
SP	Between Groups	4.815	3	1.605	1.717	.165	
	Within Groups	185.129	198	.935			
	Total	189.944	201				

## Educational Level

### Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
						Lower Bound	Upper Bound		
PIEMA	High School	26	3.64	.743	.146	3.34	3.94	2	5
	Bachelor Degree	145	3.54	.837	.069	3.40	3.68	2	5
	Master Degree	31	3.49	1.004	.180	3.12	3.86	2	5
	Total	202	3.55	.850	.060	3.43	3.66	2	5
ITAEMA	High School	26	3.33	.905	.177	2.96	3.70	2	5
	Bachelor Degree	145	3.39	.869	.072	3.25	3.54	2	5
	Master Degree	31	3.21	.773	.139	2.92	3.49	2	5
	Total	202	3.36	.859	.060	3.24	3.48	2	5
PBEMA	High School	26	3.49	.757	.148	3.18	3.79	2	5
	Bachelor Degree	145	3.60	.817	.068	3.46	3.73	2	5
	Master Degree	31	3.52	.959	.172	3.17	3.87	2	5
	Total	202	3.57	.829	.058	3.46	3.69	2	5
TMS	High School	26	3.49	.665	.130	3.22	3.76	2	5
	Bachelor Degree	145	3.41	.888	.074	3.26	3.55	2	5
	Master Degree	31	3.17	.869	.156	2.85	3.49	2	5
	Total	202	3.38	.861	.061	3.26	3.50	2	5
PS	High School	26	3.27	.784	.154	2.95	3.59	2	5
	Bachelor Degree	145	3.40	.842	.070	3.26	3.54	2	5
	Master Degree	31	3.33	.880	.158	3.01	3.65	2	5
	Total	202	3.37	.838	.059	3.26	3.49	2	5
DS	High School	26	3.61	.638	.125	3.35	3.87	3	5
	Bachelor Degree	145	3.51	.742	.062	3.39	3.63	2	5
	Master Degree	31	3.29	.733	.132	3.03	3.56	2	5
	Total	202	3.49	.730	.051	3.39	3.59	2	5

NF	High School	26	3.26	.781	.153	2.94	3.57	2	5
	Bachelor Degree	145	3.30	.876	.073	3.16	3.44	2	5
	Master Degree	31	3.16	.968	.174	2.81	3.52	2	5
	Total	202	3.27	.876	.062	3.15	3.40	2	5
Clan	High School	26	3.38	.947	.186	3.00	3.77	2	5
	Bachelor Degree	145	3.60	.877	.073	3.45	3.74	2	5
	Master Degree	31	3.46	1.017	.183	3.09	3.84	2	5
	Total	202	3.55	.907	.064	3.42	3.67	2	5
Adhocracy	High School	26	2.86	1.117	.219	2.41	3.31	1	5
	Bachelor Degree	145	2.84	1.072	.089	2.66	3.01	1	5
	Master Degree	31	2.73	.969	.174	2.38	3.09	1	4
	Total	202	2.83	1.058	.074	2.68	2.97	1	5
Market	High School	26	3.64	.966	.189	3.25	4.03	2	5
	Bachelor Degree	145	3.58	.952	.079	3.43	3.74	2	5
	Master Degree	31	3.34	.939	.169	3.00	3.69	2	5
	Total	202	3.55	.952	.067	3.42	3.69	2	5
Hierarchy	High School	26	4.07	.918	.180	3.70	4.44	2	5
	Bachelor Degree	145	4.19	.825	.069	4.06	4.33	2	5
	Master Degree	31	4.45	.761	.137	4.17	4.73	3	5
	Total	202	4.22	.831	.058	4.10	4.33	2	5
CP	High School	26	3.06	.746	.146	2.76	3.36	1	4
	Bachelor Degree	145	3.08	.918	.076	2.93	3.24	1	5
	Master Degree	31	3.10	.975	.175	2.74	3.45	1	5
	Total	202	3.08	.903	.064	2.96	3.21	1	5
NP	High School	26	3.23	.918	.180	2.86	3.60	1	5
	Bachelor Degree	145	3.12	.886	.074	2.97	3.26	1	5
	Master Degree	31	2.94	1.090	.196	2.54	3.34	1	5
	Total	202	3.10	.923	.065	2.98	3.23	1	5
LC	High School	26	3.03	.862	.169	2.69	3.38	2	5
	Bachelor Degree	145	3.38	.722	.060	3.26	3.50	2	5
	Master Degree	31	3.15	.924	.166	2.81	3.48	2	5
	Total	202	3.30	.782	.055	3.19	3.41	2	5
SP	High School	26	3.11	1.041	.204	2.69	3.53	1	5
	Bachelor Degree	145	3.00	.937	.078	2.85	3.15	1	5
	Master Degree	31	3.15	1.090	.196	2.75	3.55	1	5
	Total	202	3.04	.972	.068	2.90	3.17	1	5

#### Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
PIEMA	2.939	2	199	.055
ITAEMA	.679	2	199	.508
PBEMA	1.398	2	199	.250
TMS	2.561	2	199	.080
PS	.538	2	199	.584
DS	.436	2	199	.648
NF	.912	2	199	.403
Clan	1.227	2	199	.295
Adhocracy	.547	2	199	.579
Market	.299	2	199	.742
Hierarchy	.595	2	199	.552
CP	1.889	2	199	.154
NP	1.558	2	199	.213
LC	2.720	2	199	.068
SP	.634	2	199	.531

#### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
PIEMA	Between Groups	.339	2	.169	.233	.793
	Within Groups	144.814	199	.728		
	Total	145.153	201			
ITAEMA	Between Groups	.918	2	.459	.620	.539

	Within Groups	147.258	199	.740		
	Total	148.176	201			
PBEMA	Between Groups	.369	2	.184	.266	.767
	Within Groups	137.912	199	.693		
	Total	138.281	201			
TMS	Between Groups	1.744	2	.872	1.179	.310
	Within Groups	147.182	199	.740		
	Total	148.926	201			
PS	Between Groups	.455	2	.228	.322	.725
	Within Groups	140.701	199	.707		
	Total	141.156	201			
DS	Between Groups	1.630	2	.815	1.538	.217
	Within Groups	105.462	199	.530		
	Total	107.092	201			
NF	Between Groups	.509	2	.254	.329	.720
	Within Groups	153.890	199	.773		
	Total	154.398	201			
Clan	Between Groups	1.247	2	.624	.756	.471
	Within Groups	164.179	199	.825		
	Total	165.426	201			
Adhocracy	Between Groups	.332	2	.166	.147	.864
	Within Groups	224.710	199	1.129		
	Total	225.042	201			
Market	Between Groups	1.683	2	.841	.928	.397
	Within Groups	180.359	199	.906		
	Total	182.042	201			
Hierarchy	Between Groups	2.262	2	1.131	1.650	.195
	Within Groups	136.421	199	.686		
	Total	138.683	201			
CP	Between Groups	.020	2	.010	.012	.988
	Within Groups	163.885	199	.824		
	Total	163.905	201			
NP	Between Groups	1.324	2	.662	.775	.462
	Within Groups	169.861	199	.854		
	Total	171.184	201			
LC	Between Groups	3.545	2	1.773	2.957	.054
	Within Groups	119.294	199	.599		
	Total	122.839	201			
SP	Between Groups	.754	2	.377	.397	.673
	Within Groups	189.190	199	.951		
	Total	189.944	201			

## Tenure in Position

### Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	
					Lower Bound	Upper Bound			
PIEMA	< 3 years	28	3.42	.909	.172	3.06	3.77	2	5
	3-5 years	24	3.56	.846	.173	3.20	3.91	2	5
	6-10 years	52	3.49	.842	.117	3.25	3.72	2	5
	> 10 years	98	3.61	.845	.085	3.44	3.78	2	5
	Total	202	3.55	.850	.060	3.43	3.66	2	5
ITAEMA	< 3 years	28	3.37	.879	.166	3.03	3.71	2	5
	3-5 years	24	3.48	.915	.187	3.10	3.87	2	5
	6-10 years	52	3.35	.840	.117	3.11	3.58	2	5
	> 10 years	98	3.33	.859	.087	3.16	3.50	2	5
	Total	202	3.36	.859	.060	3.24	3.48	2	5
PBEMA	< 3 years	28	3.55	.925	.175	3.19	3.91	2	5
	3-5 years	24	3.51	.785	.160	3.18	3.85	2	5
	6-10 years	52	3.58	.738	.102	3.38	3.79	2	5
	> 10 years	98	3.59	.868	.088	3.41	3.76	2	5
	Total	202	3.57	.829	.058	3.46	3.69	2	5

TMS	< 3 years	28	3.49	.922	.174	3.13	3.85	2	5
	3-5 years	24	3.35	.926	.189	2.96	3.75	2	5
	6-10 years	52	3.45	.843	.117	3.21	3.68	2	5
	> 10 years	98	3.32	.844	.085	3.15	3.49	2	5
	Total	202	3.38	.861	.061	3.26	3.50	2	5
PS	< 3 years	28	3.24	.866	.164	2.90	3.57	2	5
	3-5 years	24	3.51	1.030	.210	3.07	3.94	2	5
	6-10 years	52	3.32	.785	.109	3.10	3.54	2	5
	> 10 years	98	3.41	.811	.082	3.25	3.57	2	5
	Total	202	3.37	.838	.059	3.26	3.49	2	5
DS	< 3 years	28	3.38	.647	.122	3.13	3.63	2	5
	3-5 years	24	3.48	.795	.162	3.14	3.81	2	5
	6-10 years	52	3.60	.724	.100	3.39	3.80	2	5
	> 10 years	98	3.47	.743	.075	3.32	3.62	2	5
	Total	202	3.49	.730	.051	3.39	3.59	2	5
NF	< 3 years	28	3.15	.818	.155	2.83	3.47	2	5
	3-5 years	24	3.35	.947	.193	2.95	3.75	2	5
	6-10 years	52	3.30	.826	.115	3.07	3.53	2	5
	> 10 years	98	3.28	.910	.092	3.09	3.46	2	5
	Total	202	3.27	.876	.062	3.15	3.40	2	5
Clan	< 3 years	28	3.40	.931	.176	3.04	3.76	2	5
	3-5 years	24	3.62	.833	.170	3.27	3.98	2	5
	6-10 years	52	3.67	.951	.132	3.40	3.93	2	5
	> 10 years	98	3.51	.898	.091	3.33	3.69	2	5
	Total	202	3.55	.907	.064	3.42	3.67	2	5
Adhocracy	< 3 years	28	2.79	.968	.183	2.42	3.17	1	5
	3-5 years	24	3.08	1.156	.236	2.60	3.57	1	5
	6-10 years	52	2.50	.961	.133	2.23	2.76	1	5
	> 10 years	98	2.95	1.081	.109	2.73	3.16	1	5
	Total	202	2.83	1.058	.074	2.68	2.97	1	5
Market	< 3 years	28	3.55	.778	.147	3.25	3.86	2	5
	3-5 years	24	3.88	.956	.195	3.47	4.28	2	5
	6-10 years	52	3.43	.930	.129	3.17	3.69	2	5
	> 10 years	98	3.54	1.001	.101	3.34	3.74	2	5
	Total	202	3.55	.952	.067	3.42	3.69	2	5
Hierarchy	< 3 years	28	4.21	.902	.171	3.86	4.56	3	5
	3-5 years	24	4.24	.922	.188	3.85	4.63	2	5
	6-10 years	52	4.23	.865	.120	3.99	4.47	3	5
	> 10 years	98	4.21	.780	.079	4.05	4.36	3	5
	Total	202	4.22	.831	.058	4.10	4.33	2	5
CP	< 3 years	28	2.98	.991	.187	2.59	3.36	1	5
	3-5 years	24	3.26	.862	.176	2.90	3.62	2	5
	6-10 years	52	2.98	.893	.124	2.73	3.23	1	5
	> 10 years	98	3.12	.896	.090	2.94	3.30	1	5
	Total	202	3.08	.903	.064	2.96	3.21	1	5
NP	< 3 years	28	3.14	.889	.168	2.80	3.49	1	5
	3-5 years	24	3.00	.806	.165	2.66	3.34	1	4
	6-10 years	52	3.04	.937	.130	2.78	3.30	1	5
	> 10 years	98	3.15	.960	.097	2.96	3.34	1	5
	Total	202	3.10	.923	.065	2.98	3.23	1	5
LC	< 3 years	28	3.17	.848	.160	2.84	3.50	2	5
	3-5 years	24	3.36	.741	.151	3.05	3.68	2	5
	6-10 years	52	3.25	.724	.100	3.05	3.46	2	5
	> 10 years	98	3.35	.808	.082	3.18	3.51	2	5
	Total	202	3.30	.782	.055	3.19	3.41	2	5
SP	< 3 years	28	2.83	.964	.182	2.45	3.20	1	5
	3-5 years	24	3.44	1.009	.206	3.02	3.87	2	5
	6-10 years	52	2.85	.926	.128	2.60	3.11	1	5
	> 10 years	98	3.10	.966	.098	2.90	3.29	1	5
	Total	202	3.04	.972	.068	2.90	3.17	1	5

#### Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
PIEMA	.161	3	198	.923

ITAEMA	.103	3	198	.958
PBEMA	1.533	3	198	.207
TMS	.304	3	198	.822
PS	1.080	3	198	.359
DS	.224	3	198	.880
NF	.590	3	198	.622
Clan	.380	3	198	.768
Adhocracy	.962	3	198	.412
Market	1.607	3	198	.189
Hierarchy	.988	3	198	.399
CP	.364	3	198	.779
NP	.830	3	198	.479
LC	.570	3	198	.636
SP	.493	3	198	.688

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
PIEMA	Between Groups	1.070	3	.357	.490	.690
	Within Groups	144.083	198	.728		
	Total	145.153	201			
ITAEMA	Between Groups	.465	3	.155	.208	.891
	Within Groups	147.711	198	.746		
	Total	148.176	201			
PBEMA	Between Groups	.117	3	.039	.056	.983
	Within Groups	138.164	198	.698		
	Total	138.281	201			
TMS	Between Groups	.925	3	.308	.412	.744
	Within Groups	148.002	198	.747		
	Total	148.926	201			
PS	Between Groups	1.241	3	.414	.585	.625
	Within Groups	139.915	198	.707		
	Total	141.156	201			
DS	Between Groups	.972	3	.324	.605	.613
	Within Groups	106.120	198	.536		
	Total	107.092	201			
NF	Between Groups	.632	3	.211	.271	.846
	Within Groups	153.766	198	.777		
	Total	154.398	201			
Clan	Between Groups	1.651	3	.550	.665	.574
	Within Groups	163.776	198	.827		
	Total	165.426	201			
Adhocracy	Between Groups	8.659	3	2.886	2.641	.051
	Within Groups	216.383	198	1.093		
	Total	225.042	201			
Market	Between Groups	3.354	3	1.118	1.239	.297
	Within Groups	178.688	198	.902		
	Total	182.042	201			
Hierarchy	Between Groups	.041	3	.014	.019	.996
	Within Groups	138.642	198	.700		
	Total	138.683	201			
CP	Between Groups	1.750	3	.583	.712	.546
	Within Groups	162.154	198	.819		
	Total	163.905	201			
NP	Between Groups	.698	3	.233	.270	.847
	Within Groups	170.486	198	.861		
	Total	171.184	201			
LC	Between Groups	.863	3	.288	.467	.706
	Within Groups	121.977	198	.616		
	Total	122.839	201			
SP	Between Groups	7.233	3	2.411	2.613	.052
	Within Groups	182.711	198	.923		
	Total	189.944	201			

**Appendix E**  
**Results of Reliability Analysis**

**Reliability-Intention to Adopt EMA (ITAEMA)**

**Case Processing Summary**

		N	%
Cases	Valid	202	100.0
	Excluded <sup>a</sup>	0	.0
	Total	202	100.0

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

Cronbach's Alpha	N of Items
.970	12

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ITAEMA1	36.99	89.980	.851	.831	.968
ITAEMA2	36.98	90.338	.843	.819	.968
ITAEMA3	36.94	89.529	.879	.840	.967
ITAEMA4	36.91	88.878	.862	.849	.967
ITAEMA5	36.88	89.638	.865	.813	.967
ITAEMA6	37.02	87.686	.867	.771	.967
ITAEMA7	36.97	89.949	.838	.760	.968
ITAEMA8	37.02	87.975	.827	.718	.968
ITAEMA9	36.79	90.335	.776	.702	.970
ITAEMA10	36.87	89.764	.836	.785	.968
ITAEMA11	36.88	89.144	.848	.827	.968
ITAEMA12	36.90	90.064	.830	.819	.968

**Reliability- Perceived Importance of EMA (PIEMA)**

**Case Processing Summary**

		N	%
Cases	Valid	202	100.0
	Excluded <sup>a</sup>	0	.0
	Total	202	100.0

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

Cronbach's Alpha	N of Items
.959	12

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PIEMA1	38.98	89.124	.742	.957
PIEMA2	38.97	89.024	.800	.956
PIEMA3	39.11	87.723	.796	.956
PIEMA4	38.96	88.168	.803	.956
PIEMA5	39.00	87.915	.801	.956
PIEMA6	39.01	86.980	.824	.955
PIEMA7	39.12	86.921	.842	.955
PIEMA8	39.00	86.905	.803	.956
PIEMA9	38.99	88.622	.757	.957
PIEMA10	38.95	86.848	.798	.956
PIEMA11	38.95	86.256	.818	.955
PIEMA12	39.00	87.950	.778	.956

**Reliability- Perceived Benefits of EMA (PBEMA)**

**Case Processing Summary**

		N	%
Cases	Valid	202	100.0
	Excluded <sup>a</sup>	0	.0
	Total	202	100.0

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

Cronbach's Alpha	N of Items
.975	15

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PBEMA1	50.03	135.078	.850	.973
PBEMA2	50.00	135.741	.815	.974
PBEMA3	50.05	134.440	.845	.974
PBEMA4	50.10	134.508	.847	.974
PBEMA5	50.07	134.473	.844	.974
PBEMA6	50.00	135.517	.817	.974
PBEMA7	50.09	135.514	.833	.974
PBEMA8	50.03	135.322	.829	.974
PBEMA9	50.02	135.139	.838	.974
PBEMA10	50.03	133.740	.879	.973
PBEMA11	50.01	134.064	.874	.973
PBEMA12	49.81	136.153	.840	.974
PBEMA13	49.93	134.731	.857	.973
PBEMA14	49.91	136.271	.801	.974
PBEMA15	50.01	135.487	.837	.974

## Reliability- Top Management Support (TMS)

### Case Processing Summary

		N	%
Cases	Valid	202	100.0
	Excluded <sup>a</sup>	0	.0
	Total	202	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's Alpha	N of Items
.965	6

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
TMS1	16.89	18.828	.869	.960
TMS2	16.89	18.738	.870	.960
TMS3	16.93	18.463	.898	.957
TMS4	16.89	18.698	.915	.955
TMS5	16.93	18.577	.887	.958
TMS6	16.92	18.621	.880	.959

## Reliability- Business Strategy (BS)

### Case Processing Summary

		N	%
Cases	Valid	202	100.0
	Excluded <sup>a</sup>	0	.0
	Total	202	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's Alpha	N of Items
.939	16



**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PS1	51.49	106.520	.689	.935
PS2	51.62	107.232	.705	.935
PS3	51.51	107.634	.691	.935
PS4	51.36	106.162	.747	.934
PS5	51.63	102.653	.780	.933
PS6	51.77	104.826	.676	.936
PS7	51.44	105.083	.754	.934
PS8	51.52	106.181	.740	.934
DS1	51.49	108.918	.609	.937
DS2	51.21	109.996	.585	.938
DS3	51.47	109.215	.616	.937
DS4	51.37	107.736	.673	.936
DS5	51.48	107.146	.707	.935
DS6	51.43	107.440	.658	.936
DS7	51.59	108.073	.633	.937
DS8	51.37	108.442	.601	.937

**Reliability- Nature of Formalization (NF)**

**Case Processing Summary**

		N	%
Cases	Valid	202	100.0
	Excluded <sup>a</sup>	0	.0
	Total	202	100.0

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

Cronbach's Alpha	N of Items
.937	6

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
NF1	16.57	18.515	.818	.925
NF2	16.54	18.787	.817	.925
NF3	16.40	19.217	.827	.923
NF4	16.23	19.898	.833	.923
NF5	16.29	20.017	.824	.924
NF6	16.19	20.246	.770	.930

## Reliability- Organizational Culture (OC)

### Case Processing Summary

		N	%
Cases	Valid	202	100.0
	Excluded <sup>a</sup>	0	.0
	Total	202	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's Alpha	N of Items
.860	24

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
OCC1	81.26	132.849	.646	.848
OCA1	82.06	132.492	.571	.849
OCM1	81.24	132.219	.603	.848
OCH1	80.54	152.600	-.247	.871
OCC2	81.31	133.507	.592	.849
OCA2	82.08	129.990	.647	.846
OCM2	81.29	133.663	.570	.850
OCH2	80.55	152.231	-.229	.870
OCC3	81.31	132.382	.685	.847
OCA3	82.00	130.540	.615	.848
OCM3	81.10	134.724	.507	.852
OCH3	80.72	153.204	-.235	.874
OCC4	81.32	132.364	.654	.847
OCA4	82.03	129.529	.661	.846
OCM4	81.38	131.434	.638	.847
OCH4	80.71	153.877	-.263	.875
OCC5	81.31	134.052	.613	.849
OCA5	82.00	129.172	.613	.847
OCM5	81.40	131.419	.653	.847
OCH5	80.74	153.028	-.227	.874
OCC6	81.37	133.750	.597	.849
OCA6	82.05	129.920	.611	.848
OCM6	81.43	130.209	.652	.846
OCH6	80.60	153.188	-.259	.872

## Reliability- Coercive Pressures (CP)

### Case Processing Summary

		N	%
Cases	Valid	202	100.0
	Excluded <sup>a</sup>	0	.0
	Total	202	100.0

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

Cronbach's Alpha	N of Items
.958	9

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
CP1	24.84	52.973	.807	.954
CP2	24.64	52.230	.812	.954
CP3	24.67	51.706	.848	.952
CP4	24.79	52.803	.822	.953
CP5	24.81	52.539	.818	.953
CP6	24.67	51.438	.872	.951
CP7	24.56	51.659	.851	.952
CP8	24.62	51.810	.845	.952
CP9	24.39	55.007	.768	.956

**Reliability- Normative Pressures (NP)**

**Case Processing Summary**

		N	%
Cases	Valid	202	100.0
	Excluded <sup>a</sup>	0	.0
	Total	202	100.0

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

Cronbach's Alpha	N of Items
.958	7

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
NP1	18.61	30.537	.840	.952
NP2	18.60	30.281	.898	.947
NP3	18.61	30.647	.884	.948
NP4	18.56	31.322	.844	.952
NP5	18.58	31.130	.856	.951
NP6	18.75	31.523	.823	.953
NP7	18.65	30.697	.824	.953

## Reliability- Legitimacy Considerations (LC)

### Case Processing Summary

		N	%
Cases	Valid	202	100.0
	Excluded <sup>a</sup>	0	.0
	Total	202	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's Alpha	N of Items
.897	5

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
LC1	13.14	9.999	.782	.866
LC2	13.38	9.646	.775	.867
LC3	13.05	10.060	.737	.876
LC4	13.11	10.365	.740	.875
LC5	13.33	10.085	.696	.885

## Reliability- Stakeholders Pressures (SP)

### Case Processing Summary

		N	%
Cases	Valid	202	100.0
	Excluded <sup>a</sup>	0	.0
	Total	202	100.0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

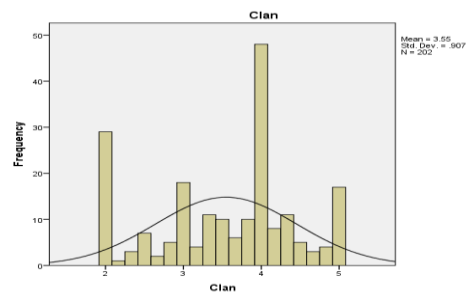
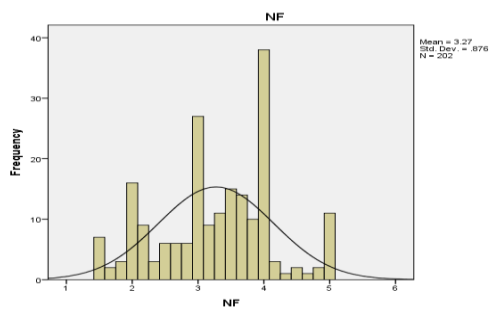
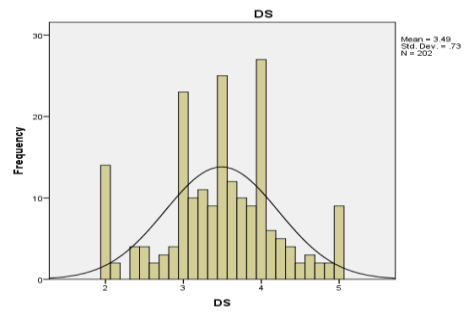
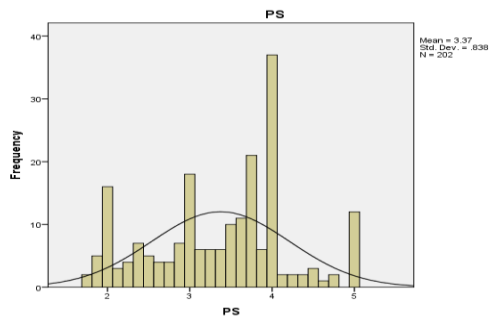
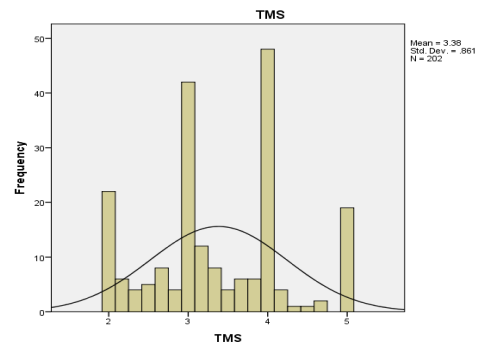
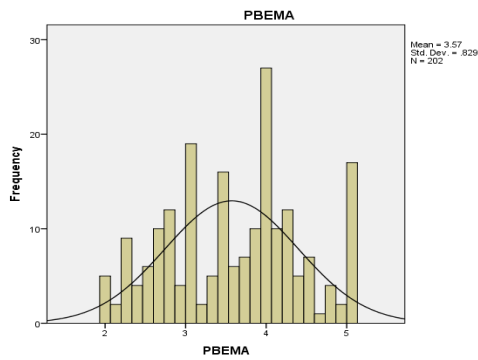
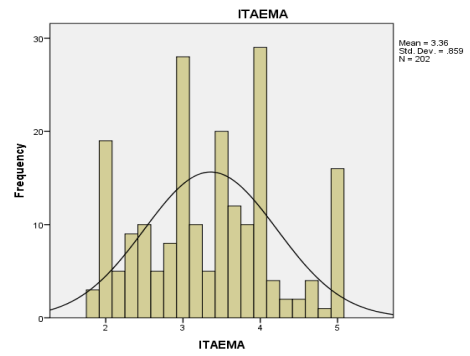
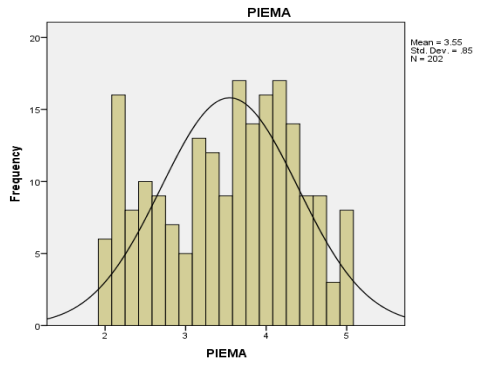
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.927	5

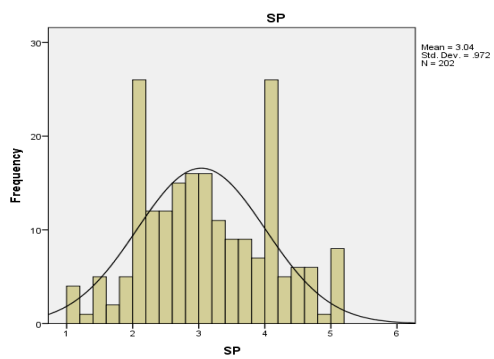
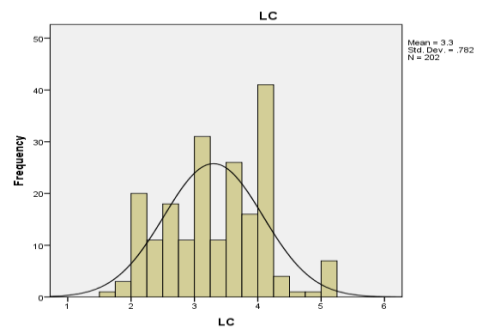
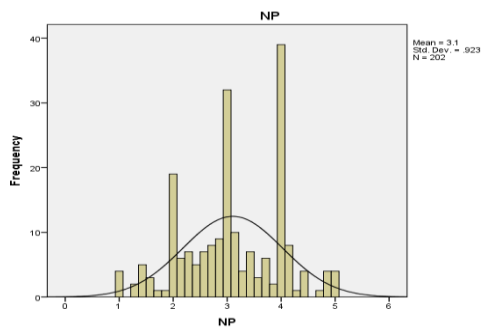
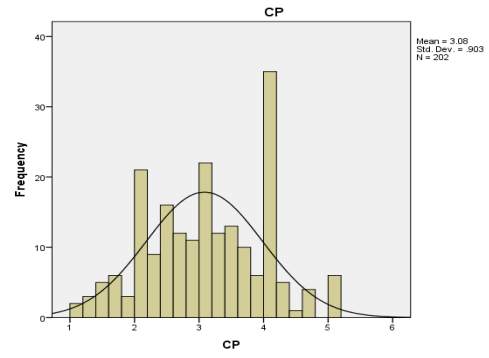
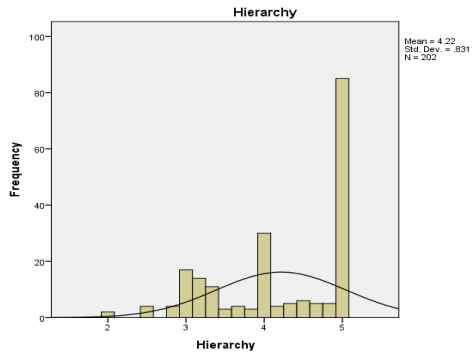
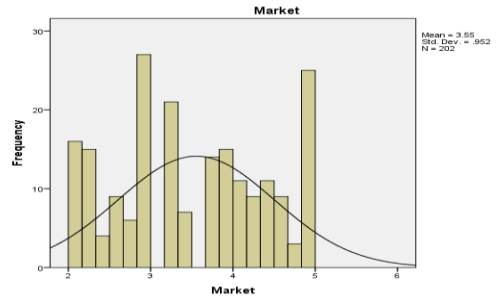
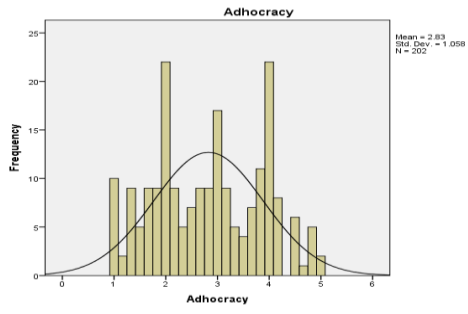
### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SP1	12.31	15.898	.756	.920
SP2	12.29	15.233	.825	.907
SP3	12.00	15.421	.778	.916
SP4	12.08	15.107	.841	.904
SP5	12.06	15.321	.843	.904

## Appendix F

### Histogram Graph for Normality





## Appendix G

### Result of Regression Analysis

#### Appendix G1:

Regression Analysis - Organizational Variables and Intention to Adopt EMA (ITAEMA)

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.885 <sup>a</sup>	.784	.775	.408

a. Predictors: (Constant), TMS, Hierarchy, Clan, DS, Adhocracy, Market, NF, PS

b. Dependent Variable: ITAEMA

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	116.121	8	14.515	87.395	.000 <sup>b</sup>
	Residual	32.055	193	.166		
	Total	148.176	201			

a. Dependent Variable: ITAEMA

b. Predictors: (Constant), TMS, Hierarchy, Clan, DS, Adhocracy, Market, NF, PS

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics		
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF	
	(Constant)	.506	.320		1.582	.115	-.125	1.137		
1	PS	.171	.050	.167	3.442	.001	.073	.269	.478	2.091
	DS	.166	.053	.141	3.160	.002	.063	.270	.559	1.788
	NF	.189	.045	.193	4.192	.000	.100	.279	.527	1.899
	Clan	.106	.039	.112	2.748	.007	.030	.182	.674	1.483
	Adhocracy	.092	.036	.114	2.530	.012	.020	.164	.555	1.803
	Market	.104	.041	.115	2.528	.012	.023	.185	.541	1.849
	Hierarchy	-.138	.043	-.134	-3.239	.001	-.223	-.054	.657	1.523
	TMS	.193	.053	.193	3.605	.000	.087	.298	.391	2.560

a. Dependent Variable: ITAEMA

## Appendix G2:

### Regression Analysis- Environmental Variables and Intention to Adopt EMA (ITAEMA)

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.849 <sup>a</sup>	.721	.716	.458

a. Predictors: (Constant), SP, CP, NP, LC

c. Dependent Variable: ITAEMA

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	106.867	4	26.717	127.410	.000 <sup>b</sup>
	Residual	41.309	197	.210		
	Total	148.176	201			

a. Dependent Variable: ITAEMA

b. Predictors: (Constant), SP, CP, NP, LC

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.248	.148		1.681	.094	-.043	.539		
	CP	.178	.046	.188	3.884	.000	.088	.269	.607	1.647
	NP	.244	.051	.262	4.785	.000	.143	.344	.472	2.119
	LC	.351	.061	.320	5.713	.000	.230	.473	.451	2.216
	SP	.212	.048	.240	4.368	.000	.116	.307	.470	2.126

a. Dependent Variable: ITAEMA

## Appendix G3:

### Regression Analysis- Organizational Variables and Perceived Benefits of EMA (PBEMA)

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.812 <sup>a</sup>	.660	.646	.494

a. Predictors: (Constant), TMS, Hierarchy, Clan, DS, Adhocracy, Market, NF, PS

b. Dependent Variable: PBEMA

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	91.275	8	11.409	46.846	.000 <sup>b</sup>
	Residual	47.006	193	.244		
	Total	138.281	201			

a. Dependent Variable: PBEMA



b. Predictors: (Constant), TMS, Hierarchy, Clan, DS, Adhocracy, Market, NF, PS

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	1.239	.388		3.196	.002	.474	2.003		
PS	.211	.060	.213	3.512	.001	.093	.329	.478	2.091
DS	.089	.064	.078	1.396	.164	-.037	.215	.559	1.788
NF	.161	.055	.170	2.946	.004	.053	.269	.527	1.899
1 Clan	.109	.047	.119	2.330	.021	.017	.201	.674	1.483
Adhocracy	.163	.044	.207	3.682	.000	.076	.250	.555	1.803
Market	.105	.050	.121	2.113	.036	.007	.203	.541	1.849
Hierarchy	-.134	.052	-.134	-2.593	.010	-.236	-.032	.657	1.523
TMS	.038	.065	.040	.591	.555	-.089	.166	.391	2.560

a. Dependent Variable: PBEMA

### Appendix G4:

Regression Analysis- Organizational Variables and Perceived Importance of EMA (PIEMA)

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.828 <sup>a</sup>	.685	.672	.487

a. Predictors: (Constant), TMS, Hierarchy, Clan, DS, Adhocracy, Market, NF, PS

b. Dependent Variable: PIEMA

**ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	99.429	8	12.429	52.461	.000 <sup>b</sup>
Residual	45.724	193	.237		
Total	145.153	201			

a. Dependent Variable: PIEMA

b. Predictors: (Constant), TMS, Hierarchy, Clan, DS, Adhocracy, Market, NF, PS

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	1.307	.382		3.419	.001	.553	2.061		
PS	.117	.059	.116	1.978	.049	.000	.234	.478	2.091
DS	.149	.063	.128	2.373	.019	.025	.273	.559	1.788
NF	.173	.054	.179	3.210	.002	.067	.280	.527	1.899
1 Clan	.129	.046	.138	2.798	.006	.038	.220	.674	1.483
Adhocracy	.095	.044	.118	2.177	.031	.009	.181	.555	1.803
Market	.089	.049	.100	1.823	.070	-.007	.186	.541	1.849
Hierarchy	-.186	.051	-.182	-3.643	.000	-.286	-.085	.657	1.523
TMS	.147	.064	.148	2.297	.023	.021	.272	.391	2.560

a. Dependent Variable: PIEMA

### Appendix G5:

Regression Analysis- Environmental Variables and Perceived Benefits of EMA (PBEMA)

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.753 <sup>a</sup>	.567	.558	.552

a. Predictors: (Constant), SP, CP, NP, LC

b. Dependent Variable: PBEMA

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.358	4	19.590	64.402	.000 <sup>b</sup>
	Residual	59.923	197	.304		
	Total	138.281	201			

a. Dependent Variable: PBEMA

b. Predictors: (Constant), SP, CP, NP, LC

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.874	.178		4.917	.000	.524	1.225		
	CP	.184	.055	.200	3.325	.001	.075	.293	.607	1.647
	NP	.183	.061	.204	2.983	.003	.062	.304	.472	2.119
	LC	.334	.074	.315	4.506	.000	.188	.480	.451	2.216
	SP	.152	.058	.178	2.600	.010	.037	.267	.470	2.126

a. Dependent Variable: PBEMA

### Appendix G6:

Regression Analysis- Environmental Variables and Perceived Importance of EMA (PIEMA)

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.830 <sup>a</sup>	.689	.682	.479

a. Predictors: (Constant), SP, CP, NP, LC

b. Dependent Variable: PIEMA

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	99.951	4	24.988	108.901	.000 <sup>b</sup>
	Residual	45.202	197	.229		
	Total	145.153	201			

a. Dependent Variable: PIEMA

b. Predictors: (Constant), SP, CP, NP, LC

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.600	.154		3.886	.000	.296	.905		
1 CP	.270	.048	.287	5.615	.000	.175	.364	.607	1.647
1 NP	.275	.053	.298	5.153	.000	.170	.380	.472	2.119
1 LC	.202	.064	.186	3.137	.002	.075	.329	.451	2.216
1 SP	.196	.051	.224	3.869	.000	.096	.296	.470	2.126

a. Dependent Variable: PIEMA

### Appendix G7:

Regression Analysis- Perceived Benefits and Perceived Importance with intention to adopt EMA

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.819 <sup>a</sup>	.671	.667	.495

a. Predictors: (Constant), PIEMA, PBEMA

b. Dependent Variable: ITAEMA

**ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	99.365	2	49.682	202.550	.000 <sup>b</sup>
1 Residual	48.811	199	.245		
1 Total	148.176	201			

a. Dependent Variable: ITAEMA

b. Predictors: (Constant), PIEMA, PBEMA

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.153	.163		.935	.351	-.169	.475		
1 PBEMA	.426	.061	.412	6.959	.000	.305	.547	.473	2.112
1 PIEMA	.475	.060	.470	7.944	.000	.357	.592	.473	2.112

a. Dependent Variable: ITAEMA

### Appendix G8:

Regression Analysis- Mediating Effect of perceived benefits on the Relationship between Organizational Variables (Prospector strategy, Nature of formalization, Clan, Adhocracy, Market and, Hierarchy culture) and Intention to Adopt EMA

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.873 <sup>a</sup>	.762	.753	.426

a. Predictors: (Constant), PBEMA, Clan, Hierarchy, Market, NF, Adhocracy, PS

b. Dependent Variable: ITAEMA

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	112.899	7	16.128	88.696	.000 <sup>b</sup>
	Residual	35.277	194	.182		
	Total	148.176	201			

a. Dependent Variable: ITAEMA

b. Predictors: (Constant), PBEMA, Clan, Hierarchy, Market, NF, Adhocracy, PS

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.747	.330		2.266	.025	.097	1.398		
	PS	.213	.051	.208	4.156	.000	.112	.315	.488	2.048
	NF	.228	.047	.232	4.874	.000	.136	.320	.540	1.852
	Clan	.132	.040	.140	3.309	.001	.054	.211	.686	1.458
	Adhocracy	.104	.039	.128	2.675	.008	.027	.181	.534	1.871
	Market	.128	.042	.142	3.037	.003	.045	.211	.563	1.776
	Hierarchy	-.148	.045	-.143	-3.289	.001	-.237	-.059	.645	1.551
	PBEMA	.154	.062	.149	2.499	.013	.033	.276	.344	2.904

a. Dependent Variable: ITAEMA

### Appendix G9:

Regression Analysis- Mediating Effect of Perceived Importance on the Relationship between Organizational Variables (Prospector strategy, Defender strategy, Nature of formalization, Clan, Adhocracy, Hierarchy culture, and Top management support) and Intention to Adopt EMA

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.885 <sup>a</sup>	.783	.774	.409

a. Predictors: (Constant), PIEMA, Clan, Hierarchy, DS, Adhocracy, NF, PS, TMS

b. Dependent Variable: ITAEMA

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	115.953	8	14.494	86.811	.000 <sup>b</sup>
	Residual	32.223	193	.167		
	Total	148.176	201			

a. Dependent Variable: ITAEMA

b. Predictors: (Constant), PIEMA, Clan, Hierarchy, DS, Adhocracy, NF, PS, TMS

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics		
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF	
1	(Constant)	.463	.326		1.419	.158	-.181	1.107		
	PS	.169	.050	.165	3.380	.001	.070	.267	.474	2.108
	DS	.145	.054	.123	2.704	.007	.039	.250	.544	1.838
	NF	.171	.047	.174	3.667	.000	.079	.262	.500	2.000
	Clan	.097	.039	.102	2.459	.015	.019	.174	.651	1.535
	Adhocracy	.093	.037	.115	2.547	.012	.021	.165	.554	1.806
	Hierarchy	-.124	.044	-.120	-2.812	.005	-.211	-.037	.619	1.616
	TMS	.203	.053	.203	3.840	.000	.099	.307	.402	2.490
	PIEMA	.139	.060	.137	2.313	.022	.020	.257	.320	3.121

a. Dependent Variable: ITAEMA

### Appendix G10:

Regression Analysis- Mediating Effect of Perceived Benefits on the Relationship between Environmental Variables (Coercive pressures, Normative pressures, Legitimacy considerations and Stakeholder pressures) and Intention to Adopt EMA

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.867 <sup>a</sup>	.751	.745	.434

a. Predictors: (Constant), PBEMA, CP, NP, SP, LC

b. Dependent Variable: ITAEMA

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	111.308	5	22.262	118.350	.000 <sup>b</sup>
	Residual	36.868	196	.188		
	Total	148.176	201			

a. Dependent Variable: ITAEMA

b. Predictors: (Constant), PBEMA, CP, NP, SP, LC

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics		
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF	
										(Constant)
1	CP	.128	.045	.135	2.871	.005	.040	.216	.575	1.740
	NP	.194	.049	.208	3.932	.000	.097	.291	.452	2.215
	LC	.260	.061	.237	4.257	.000	.140	.381	.409	2.444
	SP	.170	.047	.193	3.650	.000	.078	.262	.455	2.199
	PBEMA	.272	.056	.263	4.859	.000	.162	.383	.433	2.308

a. Dependent Variable: ITAEMA

### Appendix G11:

Regression Analysis- Mediating Effect of Perceived Importance on the Relationship between Environmental Variables (Coercive pressures, Normative pressures, Legitimacy considerations and Stakeholder pressures) and Intention to Adopt EMA

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.858 <sup>a</sup>	.737	.730	.446

a. Predictors: (Constant), PIEMA, CP, LC, SP, NP

b. Dependent Variable: ITAEMA

**ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	109.193	5	21.839	109.802	.000 <sup>b</sup>
	Residual	38.983	196	.199		
	Total	148.176	201			

a. Dependent Variable: ITAEMA

b. Predictors: (Constant), PIEMA, CP, LC, SP, NP

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics		
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF	
										(Constant)
1	CP	.117	.048	.123	2.433	.016	.022	.212	.523	1.911
	NP	.182	.053	.195	3.434	.001	.077	.286	.416	2.405
	LC	.306	.061	.278	4.978	.000	.184	.427	.430	2.326
	SP	.167	.049	.189	3.415	.001	.071	.264	.437	2.288
	PIEMA	.227	.066	.225	3.420	.001	.096	.358	.311	3.211

a. Dependent Variable: ITAEMA