

Environmental management accounting in the Middle East and North Africa region: Significance of resource slack and coercive isomorphism

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ABSTRACT

The Middle East and North Africa (MENA) region is suffering from serious environmental issues, which are caused mainly by industrial and non-financial business activities. Implementing environmental management accounting (EMA) will help businesses manage environmental issues better and improve how they treat the environment. The key motivation for undertaking this study is that earlier research reported a poor level of environmental accounting practices by firms in the MENA region. These studies documented the necessity to develop a better understanding of EMA practices and the factors that influence their employment. Based on the new institutional sociology (NIS) perspective of institutional theory and resource slack theory, this study examines the influence of technological capabilities, environment-focused human resources management (EFHRM) and institutional isomorphism, specifically on the extent to which EMA practices are implemented in non-financial listed firms from eight MENA countries. These countries are Saudi Arabia, United Arab Emirates, Kuwait, Oman, Qatar, Bahrain, Jordan and Egypt. A web-based survey approach was utilised; and the data was analysed through structural equation modelling (SEM). The findings indicated an overall poor widespread of the use of EMA practices in the selected firms as perceived by the participants. Also, the findings suggest that technological capabilities, EFHRM and coercive isomorphism positively and significantly influence how EMA practices are implemented. Coercive pressures, technological and human resources are affecting the extent of EMA use in this study's sample, but not to a great extent. Hence, coercive pressures should be maximised by regulatory bodies in the selected MENA countries in order for EMA practices to be widely accepted. Furthermore, governments should facilitate the outsourcing of experts who can help with implementing EMA practices. It means collaborating with non-government partners, such as accounting associations, industry associations, research & consulting firms and educational institutions. These kinds of collaborations can lead to better support for environmental management and EMA, thus instituting the required educational programs and training to enhance employees' awareness of EMA practices that include the role of technology.

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1. Introduction

The natural environment in the Middle East and North Africa (MENA) region is at risk, suffering from serious problems such as high levels of air pollution, hazardous solid and liquid waste, desertification and water scarcity (MENA Economic Monitor, 2014). The MENA countries where the sample of companies are based, have been ranked lowest with regard to environmental health

evaluation conducted using the environmental performance index established by Yale University and Columbia University (Index, 2008). An environmental report published by the World Bank Group stated that 'the [MENA] region is threatened by declining per capita water resources, loss of arable land, pollution-related health problems, deteriorating coastal zones and vulnerable marine life' (The World Bank, 2008, p. 1). In the MENA region, the main causes of severe pollution are business and industrial activities (The World Bank, 2008; Ramsey, 2016). Businesses and industrial activities are creating major environmental problems in the form of carbon emissions, pollution, waste generation and uncontrolled use of

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limited physical resources in the MENA region (Blackman, 2001). In this study, non-financial listed firms from multiple sectors have been investigated regarding their EMA practices. Financial firms are not considered as they do not produce hazardous chemicals or discharge toxic pollutants and thus they might not be viewed as creating direct environmental impacts (Cowton and Thompson, 2000).

The issues mentioned above require effective management practices to reduce damage being done to the environment. One step in the right direction is considering the use of Environmental Management Accounting (EMA) practices (Burritt and Saka, 2006; Jasch and Savage, 2005). The principal aim of EMA is to enhance knowledge, practices and decision-making in organisations (Savage et al., 2001). Managers have become interested in information generated through the use of EMA practices for various reasons, such as to promote compliance with environmental laws and to meet the needs of environmental policies and for governance purposes (Gray, 2000). EMA information is vital for environmental management initiatives so that sustainable supply chain management, cleaner production, green products or goods/services design and environmental management systems (EMS) can be put into practice (Jasch and Savage, 2005). Thus, to improve firm environmental performance, environmental management practices need to be undertaken; in return EMA serves as an extremely useful function to enhance environmental management practices. The focus in this article is as a result on EMA practices. The aim is to address the factors which affect the use of EMA practices in the MENA region. Also, this study aims to explore the extent of implementation of EMA practices by non-financial, listed companies in the selected MENA countries.

Despite the benefits of EMA for the management of environmental degradation issues as mentioned above, the findings of earlier EMA research indicated a very poor level of EMA practices by firms in the MENA region (Al-Khuwiter, 2005; Kamla, 2007; Rahahleh, 2011). This is a key motivation for undertaking this study. The literature has indicated the necessity to develop a better understanding of such practices and the factors that make more use of EMA practices in organisations in the MENA countries (Al-Khuwiter, 2005; Kamla, 2007; Rahahleh, 2011). Most EMA research has been conducted in developed countries, such as the USA, the UK, and Australia. There is a lack of EMA research in developing countries like Saudi Arabia, Jordan, and other MENA nations (Al-Khuwiter, 2005; Kamla, 2007; Rahahleh, 2011). Conducting an EMA study in the MENA region generates insights on the extent of EMA practices and the factors which influence these practices in listed companies. This is the main contribution to the EMA literature: analysing and presenting in-depth key factors which lead to the adoption of EMA practices or otherwise. It is important to consider this scenario because EMA has the potential to promote beneficial environmental practices that will improve how business is done.

An important point which needs to be kept in mind is that environmental management by business is not something that can be undertaken on a purely voluntary basis. Environmental legislation, such as that present in the investigated MENA countries creates not just an expectation but more a requirement for companies to take the environment seriously. A change has occurred in environmental policies in that most of the MENA countries did ratify the Kyoto Protocol 2005, an international treaty on climate change led by the United Nations. Freedman and Jaggi (2005, p. 216) stated that 'A key aspect of this Protocol is that greenhouse gases emitted by vehicles, power plants, and certain types of industrial operations need to be brought to acceptable levels in order to control their global warming effect'. The selected MENA countries issued environmental legislation and enforced environmental regulations;

consequently, organisations (that are deemed to be damaging the environment) are legally required to install, execute and oversee what their environmental impact, and to quantify and report their impacts to the relevant governmental departments on a regular basis. Legislation in the MENA region includes the following: Decree of the Bahraini Environmental Law (1996); Emirati Federal Law on the Protection and Development of the Environment (1999); Omani Law on Conservation of the Environment and Prevention of Pollution (2001); Saudi Arabian General Environmental Regulations and Rules for Implementation (2001); Qatari Environmental Protection Law (2002); Egyptian Environmental Protection Law (2009); The Kuwaiti Environmental Protection Law (2014); and Jordanian Environmental Protection Law (2017).

Non-compliance with legislation will result in serious environmental and business repercussions, for example a criticised business image and higher costs. The outcomes of changes to environmental laws were apparent in media reports concerning those companies that incurred environmental penalties or plants that had to temporarily ceased operations due to non-compliance with environmental regulations (Al-Anba, 2019; Al-Sharqawi, 2014; Mubasher, 2013). Mokhtar et al. (2016) argued that when firms face unprecedented pressure to demonstrate their environmental commitment, firms will act effectively by promptly implementing EMA practices in order to survive. This argument is consistent with other EMA studies (Christ and Burritt, 2013; Lee, 2012; Sulong et al., 2015). Nevertheless, not enough research has been done on institutional pressure on firms to employ EMA practices in the MENA region. It is not clear whether current government policies and legislation compel firms to be environmentally committed in practice. In order to answer this question, this study examines the relationship between institutional pressures and the use of EMA practices. This study particularly emphasises that government pressure is not enough; it has to be the right type of pressure. In prior studies, coercive isomorphism as government pressure is seen to be a generic consideration. A simple 'yes or no' answer is not adequate. It is the type of pressure which wields a great influence on environmental management and firms' EMA practices.

Another unresearched issue concerning the implementation of EMA in the MENA region is resource constraints (Sakmar et al., 2011). This is consistent with other studies conducted in different parts of the MENA region that investigated what hinders the implementation of EMS, for example Massoud et al. (2010), Mariotti et al. (2014) and Sajwani and Nielsen (2019). These studies indicated that the lack of resources (e.g. people and technology) in organisations was a major barrier in implementing EMS. Hence, this study argues that effective institutional pressures are vital, but need to be accompanied by sufficient human and technological resources that make the implementation of EMA possible. The importance of technological and human resources in relation to EMA has rarely been investigated although the literature has implied such influence in the area of environmental management. It has been argued that environmental initiatives, practices or systems require commitment by business management and employees. They will probably mean the imposition of high costs, since such initiatives will require budgets for continuous research and development or environmentally-friendly equipment being purchased (Arroyo, 2017; Darnall and Edwards, 2006; Mesmer-Magnus et al., 2012; Mokhtar et al., 2016). A lack of qualified human resources will hinder the implementation of environmental management systems (EMS) or other environmental initiatives (Berrone and Gomez-Mejia, 2009; Bowen, 2002; Waxin et al., 2017). Other research has argued that technological capabilities are vital for corporate environmental management (Burritt et al.,

2019; Bowen, 2002; Chuang and Huang, 2018). Therefore, this study attempts to fill this under-researched area by investigating two domains of resources: firstly, technological capabilities; and secondly, environmentally focused human resources management (EFHRM).

2. Literature review

The concept of EMA emerged in the early 1990s when the Environmental Protection Agency in United States of America (USA) promoted the widespread adoption of EMA; subsequently, organisations worldwide in more than 30 countries have applied EMA to several categories of environment-related management initiatives (Savage et al., 2001). The United Nations Division for Sustainable Development (UNSD) contributed to the development of EMA by establishing a working group in 2001 that specialises in EMA practices and principles (Jasch, 2006). The International Federation of Accountants (IFAC) also developed an EMA guidance document in 2005, which is a primary resource for EMA research and application (Burritt, 2004; Ferreira et al., 2010; Jasch and Savage, 2005). IFAC and UNSD (Jasch and Savage, 2005; Savage et al., 2001) and EMA pioneers (Bennett and James, 1998; Burritt et al., 2002; Schaltegger et al., 2000) indicate there is no universal single definition of the concept of EMA but have suggested EMA is an effort to integrate monetary with physical environmental information for internal management use.

This integration results in environmentally oriented management accounting practices (Jasch and Savage, 2005). Monetary environmental information represents environmental costs for the organisation's environmental activities in currencies (e.g. USD or AUD) and generates them through management accounting systems that are environmentally-oriented (partially-adjusted or fully-designed to capture environmental costs). Meanwhile the physical environmental information represents an organisation's environmental activities in non-financial units (e.g. hours, litres, or kWh) and generates them by physical environmental systems, which are designed by engineering or environmental departments, etc. The above description is used by this study to understand the concept of EMA. The study uses the term 'EMA practices' to refer to the integration mentioned above, following several empirical studies (Ferreira et al., 2010; Jalaludin et al., 2011; Jamil et al., 2015; Mokhtar et al., 2016). The IFAC's guidance document regarding EMA has further discussed two wide-ranging types of information considered under EMA (Jasch and Savage, 2005). The first type is monetary EMA (MEMA) information, which includes numerous sorts of environmental costs such as environmental taxes, protection expenditures, materials-driven costs. The second type, physical EMA (PEMA) information, consists of data on the usage, flows and final destiny of materials, energy, water and wastes (Jasch and Savage, 2005). Key benefits of EMA information include it is strategizing role for establishing environmental management initiatives such as sustainable supply chain management, cleaner production, green product or service design and EMS (Jasch and Savage, 2005). The principal aim of EMA is to enhance internal knowledge and decision-making in organisations (Savage et al., 2001). Managers have become interested in information provided by EMA practices for various reasons, such as compliance with environmental laws and the need to manage organisations' environmental impacts (Gray, 2000).

Researchers in developed countries began investigating EMA practices that enhance corporate environmental management (Bartelmus et al., 1991; Bebbington et al., 1994; Burritt et al., 2002; El Serafy and Lutz, 1989; Kreuze and Newell, 1994; Rubenstein, 1990, 1991, 1992; Schaltegger et al., 2000; Schaltegger and Stinson, 1994; Wulfstat et al., 1993). There is little environment-

related accounting research in MENA countries, which indicates marginal levels of usage of EMA practices (Al-Khuwiter, 2005; Jahamani, 2003). For example, Al-Khuwiter (2005) investigated environmental accounting and disclosure practices in Saudi Arabia as perceived by financial managers, certified practising accountants and accounting academics; the results indicated that such practices existed only in very few of the top 100 Saudi firms. This is consistent with findings of another study conducted in Jordan and UAE by Jahamani (2003) which investigated green accounting practices in terms of environmental awareness, environmental involvement and environmental reporting. Ahmed and Hamed (2018) pointed out that Egyptian companies have 'inadequate accounting systems which fail to incorporate the true environmental cost into the company's balance sheet'. The present study addresses in detail those factors which influence firms' EMA practices in the MENA region. It identifies the limitations of reduced legislation and its enforcement, suggesting that symbolic legislation, although a coercive isomorphic undertaken by governments is not enough to generate adequate environmental management and EMA that can substantially reduce negative business environmental impacts. We propose a more refined government coercive isomorphic pressure to promote better business environmental performance.

There has been a growing body of survey-based research investigating the determinants of using EMA practices, which can be classified into four groups: empirical studies (Ferreira et al., 2010; Ismail et al., 2014; Qian et al., 2018); research based on contingency theory (Christ and Burritt, 2013; Mokhtar et al., 2016; Phan et al., 2017); research based on institutional theory (Jalaludin et al., 2011; Jamil et al., 2015); and research derived from the natural resource-based view (Jamil et al., 2015; Solovida and Latan, 2017). Still, the contributions to knowledge in EMA research are evolving and more research in this area is required (Christ and Burritt, 2013; Mokhtar et al., 2016).

A further important point is that EMA research has not in the past integrated institutional theory with resource-based theories. We have considered our findings from both perspectives as the right type of environmental legislation would create the required pressure for businesses to undertake appropriate environmental management (and EMA), but only if the right amount of resources (human, financial and technological) are available to the firm. Darnall, Henriques and Sadosky (2008) found that both resource-based view and institutional theory determine firms' motivations for EMS implementation at the facility level. This is consistent with the findings of Darnall (2003) which utilised institutional theory with the resource based-view and discovered that both internal capabilities with external pressures predict firms' decisions regarding EMS-ISO 14001 certification. In the present study, the researchers integrate the theory of resource slack with the NIS perspective of institutional theory to justify the argument that both institutional pressure and resources are vital determinants of EMA practices and that they complement each other. The next section addresses the theoretical framework and hypotheses development in the light of these two theories.

3. Theoretical framework and hypotheses development

3.1. The theory of resource slack

Resource slack can be described as supplementary financial resources, inventory, labour, machines and space, which can be used for monetary and non-monetary charitable or strategic purposes (Seifert et al., 2004). Bourgeois (1981, p. 30) stated that resource slack is a 'cushion of actual or potential resources which allows an organisation to adapt successfully to internal pressures for adjustment or to external pressures for change in policy, as well

as to initiate changes in strategy with respect to the external environment'. Several studies that looked at corporate social/environmental performance (CSP/CEP), such as Russo and Fouts (1997), Ullmann (1985), Waddock and Graves (1997), as well as analyses from research on corporate social/environmental responsibility, such as Cheng et al. (2016) and McGuire et al. (1988) have utilised resource slack theory. According to Waddock and Graves (1997, p. 306), 'If slack resources are available, then better social performance would result from the allocation of these resources into the social domains'.

Non-financial slack in the form of maintaining sufficient slack of human resources (staff and their workplace hours) can help implement or improve an existing EMS and investment in clean production technology that can assist firms to gain legitimacy in terms of environmental commitments (Bowen, 2002). Some EMA studies have indicated that EMA practices might represent a challenge or barrier to some companies due to the potentially high costs of using these practices, especially for firms not well endowed with resources (Kapardis and Setthasakko, 2010; Mokhtar et al., 2016). Firms thus need to spend generously on training accounting personnel, research and development and purchase of environmental technology for environmental initiatives such as EMA practices (Mokhtar et al., 2016). The present study builds on the above argument that the availability of slack in human and technological resources is necessary to carry on with using EMA practices in the selected firms.

3.2. NIS perspective of institutional theory

The NIS perspective of institutional theory has been viewed as the mainstream perspective in organisational studies among other institutional perspectives since the 1970s (Scott, 2013). Four decades later, the NIS perspective of institutional theory has emerged as the mainstream perspective of institutional theory in EMA research—for instance, the work of Chang (2007), Jalaludin et al. (2011), Christ and Burritt (2015), Jamil et al. (2015) and Phan (2017). The coercive mechanisms of institutional isomorphism represent the regulative and enforcing pressure of certain institutions, which are considered an essential determinant of the function and structure of organisations (Chang, 2007). The mimetic mechanisms of institutional isomorphism represent uncertainty among an organisation's leadership because it lacks the knowledge required to make a wise decision (DiMaggio and Powell, 1983). In such cases, the organisation tends to follow structures or practices used by other superior and similar organisations to: firstly, survive, to gain legitimacy (Meyer and Rowan, 1977); and secondly, obtain a share of the market (Chang, 2007). The normative mechanisms of institutional isomorphism represent the normative pressure that stems mainly from professionalisation. DiMaggio and Powell (1983, p. 151) illustrated two main aspects of professionalisation: 'One is the resting of formal education and of legitimation in a cognitive base produced by university specialists. The second is the growth and elaboration of professional networks that span organisations and across which new models diffuse rapidly'. Formal education affects the way individuals act and manage different issues. The hypotheses of this study are explained through the lenses of the NIS perspective of institutional theory with the resource slack theory in the following sections.

3.3. Environmental focused human resources management (EFHRM) and the use of EMA

Based on resource slack theory, this study investigates EFHRM as it relates to accountants or other relevant personnel who deal with EMA practices, as a factor that can affect EMA practices. EFHRM

integrates environmental activities into the broader human resource management (Ashraf et al., 2015) and aligns environmental policies with traditional human resource practices. This can be attained through the focus of organisational strategy on attracting relevant talents, acquiring the knowledge, skills and competence essential for environmental activities and practices (Nejati and Ahmad, 2015). Therefore, the availability of adequate and qualified human resources is considerably beneficial to environmental initiatives and their related tools, such as EMS and EMA practices. Prior research has indicated that the absence of skilled employees and experts can impair the implementation of environmental initiatives (Berrone and Gomez-Mejia, 2009; Bowen, 2002; Darnall and Edwards, 2006; Mesmer-Magnus et al., 2012; Waxin et al., 2017). In particular, environmental management research has indicated that the lack of qualified staff can pose a problem when implementing EMS (Bowen, 2002; Waxin et al., 2017). Training accountants to deal with environmental management issues can enhance the operations of a successful EMS as indicated by Wilmshurst and Frost (2001) who explained the role of accountants in the development of EMS as:

Accountants are trained in skills required for the development and operation of appropriate EMSs that result in the recording, reporting, disclosure and verification of a firm's performance including its environmental performance. The accountant can assist in identifying environmental information, which is relevant to decision making about the reliability of measures and in organising an EMS that enhances the communication of results in an understandable form (pp. 136–137).

EMA is a leading-edge management accounting tool, which centres around the use of information along with monetary and physical resources created and used by an organisation, such as innovative capacities, trained personnel, work processes and systems (Jasch, 2006). According to Mokhtar et al. (2016), who investigated EMA use in Malaysian firms, in order to establish environmental initiatives, organisations need to generate information through endless research and development or 'green' equipment acquisition, all of which require commitment by management and employees but with high costs involved. Therefore, having discussed the positive influence of EFHRM on EMA practices, the following hypothesis is tested:

H1. There is a positive relationship between EFHRM and the extent of EMA use.

3.4. Technological capabilities and the use of EMA

Overall, environmental performance strategies involve substantial investment in the redesign of products, green production lines, advanced technologies and well-trained employees (Berrone and Gomez-Mejia, 2009). Businesses have been encouraged to adopt modern technologies to enhance their environmental performance (Nash and Ehrenfeld, 1997). Hence, resource slack theory is used to support this argument because information technology (IT) now provides great assistance for firms to develop management accounting systems and strategies (Hyvonen, 2008). The management accounting literature indicated there is an association between IT and management accounting systems (Al-Shbiel and Al-Olimat, 2016; Ismail, 2007). The IFAC's EMA guidance document revealed that EMA practices stem from management accounting systems either modified or fully designed for EMA purposes and that both EMA and management accounting share several goals (Jasch and Savage, 2005). The acquisition of equipment that

generate non-financial environmental information would aid EMA as well. Environmental initiatives including the use of EMA practices require the purchase of such equipment to produce or reconfigure eco-friendly products (Mokhtar et al., 2016). EMA literature has emphasised the role of EMA in achieving corporate sustainability through the integration of non-financial with financial information (Bennett and James, 1998; Burritt et al., 2002; Jasch and Savage, 2005; Savage et al., 2001). Consequently, this study builds on the above argument that the availability of advanced technological capabilities is necessary for utilising EMA practices, so the following hypothesis is introduced:

H2. There is a positive relationship between technological capabilities and the extent of EMA use.

3.5. Institutional isomorphisms and the use of EMA

Existing EMA literature has argued that the three mechanisms of institutional isomorphism – coercive, mimetic and normative – boost the use of EMA practices as underlined by the NIS perspective of institutional theory (Chang, 2007; Christ, 2015; Jalaludin et al., 2011; Jamil et al., 2015; Phan, 2017). Coercive institutional isomorphism occurs because of interactions with other organisations, such as environmentally responsible suppliers, creditors and pre-dominantly with environment performance-related governmental regulations (Chathurangani and Madhusanka, 2019; Jamil et al., 2015). In the absence of governmental pressure, organisations are less likely to undertake EMA practices (Chang, 2007). Also, institutional normative isomorphism results from collaborations with environmentally responsible educational institutions, professional networks or associations (Jamil et al., 2015). If key executives are not exposed to EMA through formal or professional education, they might make environment-related decisions based on using existing (conventional) accounting knowledge (Chang, 2007). It is important to note that various mechanisms of conventional management accounting, such as job order costing, process costing, budgeting, cost benefit analyses have not included environmental considerations. Institutional mimetic isomorphism occurs in cases of uncertainty when firms copy or emulate EMA practices of other firms that are environmentally responsible; they do this in order to survive and secure resources (Aerts et al., 2006). Thus, this study argues that the three types of institutional isomorphism (coercive, normative and mimetic) impose institutional pressures on the non-financial listed firms in selected MENA countries as hypothesised below:

H3. There is a positive relationship between coercive isomorphism and the extent of EMA use.

H4. There is a positive relationship between normative isomorphism and the extent of EMA use.

H5. There is a positive relationship between mimetic processes and the extent of EMA use.

3.6. Control variables and the use of EMA

It has been argued that EMA practices vary from industry to industry (Frost and Wilmshurst, 2000; Mokhtar et al., 2016). Therefore, this study uses the environmental sensitivity of industry as a control variable. EMA literature, such as the work of Christ and

Burritt (2013) and Ferreira et al. (2010), has divided the industries into two groups: 1) environmentally sensitive industries¹ that have serious negative environment impacts (e.g., oil, gas, chemical and extractive industries) through their business activities and produce high levels of carbon emissions and waste; and 2) industries which have less negative environmental impacts for example media-related manufacturing, textiles, education, telecommunication and healthcare services. Non-financial firms are classified as either environmentally sensitive or least environmentally sensitive. For example, business activities of media and healthcare services do less harm to the environment compared to chemicals, mining and extraction industries which are environmentally sensitive industries. The age of a company is another control variable that is used in accounting studies which employ the theory of resource slack (Mishina et al., 2004; Mousa and Reed, 2013). This is due to the reason that old firms have many more opportunities to implement and use EMA practices compared to younger firms which have less resources to invest in environmental management and EMA practices. Mishina et al. (2004) stated that 'older companies have had greater opportunities to develop their resource base and may pursue different growth strategies than younger firms' (p. 1188). The third control variable is the firm's nationality since prior environment-related accounting studies conducted in several countries concluded that their analyses need to control for cross-country effects. This is because legal systems and the regulatory enforcement levels concerning the environment could vary among countries (Freedman and Jaggi, 2005; Lang et al., 2003).

4. Research method

4.1. Sampling and survey administration

This study is designed to empirically investigate the use of EMA practice through a web-based survey of listed non-financial firms across eight MENA countries: Saudi Arabia, Egypt, Jordan, UAE, Oman, Kuwait, Qatar and Bahrain. Several environmental accounting studies have included more than one MENA country in their targeted sample, and the frequency of such studies supports the applicability of this approach. Those studies include Kamla (2007), Eljayash et al. (2012), Akrouf and Othman (2016), and Gerged et al. (2018). In this study, the homogeneity of non-financial listed firms across selected MENA countries was carefully assessed and became the basis for choosing those eight countries. In addition to the similarity in geopolitical factors, language and religion with reference to the location of the non-financial listed firms in the eight countries, there are other noteworthy indications of homogeneity. Homogeneity across the targeted firms is mainly driven by the similar intensity levels of environmental regulations imposed on them. The chosen MENA countries have developed enforceable environmental legislation and consequently, companies classified as environmentally sensitive are legally bound to install the necessary environmental technology, execute environmental standards and handle their environmental impacts. Also, they must regularly report on their environmental impacts to government bodies (Decree of the Bahraini Environmental Law, 1996; Emirati Federal Law on the Protection and Development of the Environment, 1999; Omani Law on Conservation of the Environment and Prevention of Pollution, 2001; Saudi Arabian General Environmental Regulations and Rules for Implementation, 2001; Qatari Environmental Protection Law, 2002; Egyptian Environmental Protection Law, 2009; The Kuwaiti Environmental Protection Law, 2014; Jordanian Environmental Protection Law, 2017; and Kuwaiti Executive Regulations for the Environment, 2017).

¹ Ferreira et al. (2010) labelled it as "high environmental risk industries" while Christ and Burritt (2013) labelled as environmentally sensitive industries. The concept is still the same in both studies.

The homogeneity among non-financial listed firms in the selected MENA countries is evident when considering the similarity of accounting and auditing standards that are used in those firms. The MENA countries that have jurisdiction over those targeted firms have mandated the International Financial Reporting Standards (IFRS), apart from Egypt (IFRS, 2018). Although Egypt has not done so, it mandated 39 Egyptian Accounting Standards in 2015, most of which derive from the Bound Volume IFRS Standards from 2013 (IFRS, 2017). The harmony among the listed non-financial firms in the MENA region can also be seen through the compulsory adoption of the International Standards on Auditing (ISA) in Saudi Arabia, UAE, Kuwait, Bahrain, Jordan and Oman (ACCA & Grant_Thornton, 2017; IFAC, 2017, 2018). Further, the Egyptian Standards on Auditing Review and Other Assurance Services are aligned with the 2005 version of ISA (IFAC, 2016). Harmonised accounting and auditing standards in countries leads to an increase in hiring of foreign accountants in countries that apply similar standards. Bloomfield et al. (2017) found this to be the case in countries of the European Union and an increase in cross-border employees (specifically, foreign accountants). Homogeneity among the non-financial firms across the selected MENA countries is predicated on the increase in hiring of foreign employees from countries that use similar accounting and auditing standards. Egyptians and Jordanians represent a substantial share of the workforce in the private sectors of the Gulf Cooperation Council (GCC) countries² (Baldwin-Edwards, 2011; Randeree, 2012; Salih, 2010).

A web-based survey makes possible the collection of such internal information from the individuals who deal with EMA practices. The survey approach has the following advantages: 1) ability to access specific populations as well as difficult-to-find populations; 2) provide speedy access to data; and 3) much less expensive than other types of questionnaires for data collection (Duffy, 2002). In the present study, the main reason for using a web-based survey method is that it can reach the participants efficiently. The population of our study comprises 604 non-financial listed firms, and mining and manufacturing firms are deemed to have a more negative influence on the environment. The targeted participants are mainly accountants, especially financial managers who usually lead the accounting practices in the selected firms. Accountants use EMA practices to effectively capture the link between financial and environmental performance for benchmarking, controlling and other purposes (Jasch, 2009). In addition, several studies investigating EMA in the MENA region and in other regions have targeted accountants, for instance Al-Khuwiter (2005), Jamil et al. (2015), Christ and Burritt (2013) and Ferreira et al. (2010). Other EMA studies targeted key personnel including accountants, CEOs, CFOs, managing directors, chief operating officer, production manager (Frost and Wilmshurst, 2000; Mokhtar et al., 2016; Phan, 2017), general managers, operating managers and environmental managers, sustainability managers (Qian et al., 2018; Solovida and Latan, 2017), and senior managers (Al-Mawali et al., 2018; Latan et al., 2018) to attain a range of views. The present study has also targeted not only accountants, but other participants who have contributed their understandings of EMA practices. The survey was pilot tested among accounting professionals and academic staff before it was distributed to the target participants.

The researchers obtained contact information—including mailing addresses, phone numbers, fax numbers and email addresses—for targeted firms from several sources, such as the

database of Orbis Bureau van Dijk, mubasher.info, recent contact list from the Riyadh Chamber of Commerce for Saudi firms, recent contact list from the Securities Depository Centre in Jordan, and the annual board of directors' report in Egyptian firms. Recruitment began by sending invitation emails written in both English (the left-hand side of the email) and Arabic (the right-hand side of the email). Two weeks later the researchers started making telephone calls and sending email reminders to the targeted firms to increase the response rate, by asking them to distribute the survey to relevant individuals (e.g. accountants, environmental managers and research and development managers).

Data collection was undertaken over six months from late October 2018 to early May 2019, and the completed responses amounted to 212, meaning in effect a 35% response rate by the 604 listed firms. This response rate is considered useable since it is consistent with previous EMA studies (Latan et al., 2018; Phan et al., 2017; Solovida and Latan, 2017). An independent sample *t*-test for non-response bias was conducted to make sure there were no significant differences in the equal variance that estimates between the early and late survey's respondents. Results indicated that out of the 42 items used in the survey, only 6 items were found to have a significant difference, but most of the items did not have significant differences in the equal variance that estimates between the early (first 20% of responses) and late (last 20% of responses) survey's respondents; hence, the non-response bias in survey of this study was unlikely to be problematic.

4.2. Measures and scales

The study utilised a construct of 12 items developed by Ferreira et al. (2010) to measure the extent of EMA practices. One last item was added by Christ and Burritt (2013). All 13 items were originally developed based on the work of Schaltegger et al. (2000) and Burritt et al. (2002). The 13 items consist of eight MEMA and five PEMA practices as illustrated in Appendix A. Participants were asked to indicate the extent to which they believe that their organisation has undertaken EMA practices during the last three years. A five-point Likert-type scale has been used, where 1 stands for 'not at all' and 5 stands for 'to a very great extent'.

In relation to the measurement of EFHRM, Daily and Huang (2001) proposed a conceptual framework for human resource factors that influence the implementation and operation of EMS-14001. These factors are senior management support, training, employee empowerment, teamwork and reward. This conceptual framework was theoretically supported by Jabbour and Santos (2008). A construct around these factors was developed by Jabbour et al. (2008) to investigate the link between human resources practices and EMS phases to continuously improve a company's environmental performance in Brazilian companies. This framework was refined later by Jabbour et al. (2010), who added three items, i.e. recruitment, selection and performance appraisal. However, recruitment and selection were merged as one factor by Jabbour and de Sousa Jabbour (2016) and Nejati et al. (2017), who proposed a synergistic and integrative framework for the relationship between green human resources management and green supply chain management. Consequently, this study has utilised the latest version of this construct by keeping the seven items used in previous research, and it is slightly modified so the focus is on accountants since they are most associated with EMA practices (EFHRM). Appendix A shows the construct that measures the EFHRM. Also, the five-point Likert-type scale asked participants to indicate the extent to which they believe the relevant statements described their organisation's human resources practices during the last three years. Please refer to Appendix A.

² The six GCC countries are Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain, and Oman.

Table 1
Location of home countries and stock exchange markets where firms are primarily listed.

	Country	Population of Firms	Frequency of Responses	%	
				Based on Country	Based on Total Responses
• Saudi Tadawul Stock Exchange (TASI)	Saudi Arabia	114	76	66.7	35.8
• The Egyptian Exchange (EGX)	Egypt	139	39	28.1	18.4
• Amman Exchange Market (ASE)	Jordan	128	30	23.4	14.2
• Kuwait Stock Exchange (KSE)	Kuwait	68	21	30.9	9.9
• Muscat Securities Market (MSM)	Oman	59	15	25.4	7.1
• Dubai Financial Market (DFM)	United	29	12	41.4	5.7
• Abu Dhabi Securities Exchange (ADX)	Arab Emirates	27	11	40.7	5.2
• Bahrain Stock Exchange (BSE)	Bahrain	17	5	29.4	2.4
• Qatar Stock Exchange (QE)	Qatar	23	3	13.0	1.4
Total		604	212	35.1	100.0

Notes: (a) the last column (%) represents the percentages out of the 212 responses.

Concerning technological capabilities, [Ojra \(2014\)](#) investigated the influence of technology on strategic management accounting practices, such as life-cycle costing, benchmarking and competitor performance appraisal in Palestinian companies. Likewise, EMA practices (e.g., product life cycle cost assessments and development and use of environment-related KPIs) are considered to be strategic management accounting practices, but they are also environmental performance-oriented practices. The principal benefit of EMA practices is that they integrate environmental aspects into operational decisions and strategic planning ([Christ and Burritt, 2013](#); [Gale, 2006](#)). This study has adopted the construct developed by [Ojra \(2014\)](#) with a slight modification to the wording and sentence structure to reflect better clarity, and it was conducted based on the feedback received during the pilot-survey and testing process. [Appendix A](#) illustrates the construct and its four items. Similar to other constructs in this study, the scale used is the five-point Likert-type scale, where 1 stands for 'not at all', and 5 stands for 'to a very great extent'. Participants were asked to indicate the extent to which they believe that the statements below describe the technological environment of their organisation during the last three years.

Regarding the measures of institutional isomorphism, this study utilised the construct developed by [Jalaludin et al. \(2011\)](#) to measure the coercive, normative and mimetic institutional isomorphism (see [Appendix A](#)). The scale used is again the five-point Likert-type scale where 1 stands for 'not at all', and 5 stands for 'to a very great extent'. Participants were asked to indicate the extent to which they believe that the statements below describe the environmental practices of their organisation during the last three years. The control variables of the firms' age and nationality and environmental sensitivity of industry were set as multiple-choice questions to be coded into multiple dummy variables.

5. Data analysis and findings

5.1. Descriptive statistics

The findings of the descriptive statistics in [Table 1](#) illustrate that participants were scattered across non-financial firms that are listed in stock exchange markets in Saudi Arabia (35.8%),³ Egypt (18.4%), Jordan (14.2%), United Arab Emirates (10.9%), Kuwait (9.9%), Oman (7.1%), Bahrain (2.4%) and lastly, Qatar (1.4%). [Table 2](#) summarises the occupation profiles of participants and we can see that at 57.5% most of them are in accountancy-related positions. Secondly, managerial occupations accounted for 23.1%. Thirdly, 9.9% of

participants held sustainability and environmental-related managerial occupations. Fourthly, chief financial officers, finance managers, or financial controllers accounted for 9% of the participants. Lastly, chief executive officers or executive assistants accounted for only 0.5% of participants. [Table 3](#) indicates that 44.3% of participants occupied positions in environmentally sensitive industries while 55.7% occupied positions in industries not classified as environmentally sensitive. [Table 3](#) indicates that the majority (63.2%) of firms (where participants were employed) have operated for more than 21 years. Firms aged between 16 and 20 years were the second most common (22.2%) while firms aged between 11 and 15 years were the third most common. Participants working in firms that have operated between six to 10 years were the least common.

Descriptive results for the extent of EMA practices used by the selected firms are presented in [Fig. 1](#). The EMA practices were ranked on the basis of their mean scores based on the average (i.e. mean) of all responses to each EMA practice.⁴ This result suggests that overall average based on all 13 mean scores of all responses was 2.60, indicating a poor level of using EMA practices during the three years preceding the survey as perceived by the participants. This study found that the more basic and general EMA practices (e.g. EMA2, EMA3, EMA6, EMA7, EMA13, EMA3) were used to a moderate extent since the average (mean) of all responses to those practices was close to the ranking score 3.00, which represents the moderate extent on the five-point Likert scale. Conversely, advanced and more sophisticated EMA practices (e.g. EMA5, EMA8, EMA9, EMA11) were rarely used since the average of the responses to those practices was close to the ranking score 2.00, which represents the small extent on the five-point Likert scale.

5.2. Model evaluation

The model analysis began by assessing the internal consistency of the constructs through the use of overall Cronbach's alpha value, which was 0.942, and for individual constructs it ranged from 0.832 to 0.965. These Cronbach's alpha values are more than the cut-off value of 0.70, which means there is high internal consistency among the observed variables. It further indicates the existence of excellent levels of construct reliability ([Hair et al., 2013](#); [Kline,](#)

³ As a percentage out of the 212 responses.

⁴ The mean scores ranked are based on the average (i.e. mean) of all responses to each EMA practice that indicates which EMA practice was used the most or the least. Participants selected answers based on the five-point Likert scale where 1 = Not at all, 2 = To a small extent, 3 = To a moderate extent, 4 = To a great extent and 5 = To a very great extent. This technique was used by relevant EMA and environmental management literature which examined the extent of perceived practices, benefits or barriers. See [Brammer et al. \(2012\)](#), [Ismail et al. \(2014\)](#) and [Zutshi and Sohal \(2004\)](#).

Table 2
Current occupations of participants.

	Frequency	Frequency %
• Chief Executive Officer (CEO) or Executive Assistant	1	0.5
• Chief Financial Officer (CFO), Finance Manager or Financial Controller	19	9.0
• Management Accountant, Cost Accountant, Financial Accountant, Product Accountant, Environmental Accountant or Chartered Accountant	122	57.5
• General Manager, Factory Manager, Facilities Manager, Manufacturing Director, Business Development Manager, Production Manager or Operation Manager	49	23.1
• Environmental Manager, Sustainability Manager, Environmental Risk Manager, Environmental Planner, Environmental Auditor, Research and Development Manager or Chief Information Officer	21	9.9
Total	212	100.0

Table 3
Characteristics of responding companies.

	Frequency	%
Environmental sensitivity of industry:		
Environmentally sensitive	94	44.3
Least environmentally sensitive	118	55.7
Total	212	100.0
Age of firms:		
More than 21 years	134	63.2
16–20 years	47	22.2
11–15 years	25	11.8
6–10 years	6	2.8
Total	212	100.0

2011).

The main analysis technique used in this study is referred to as structural equation modelling (SEM), which has been used in prior EMA research, for example [Latan et al. \(2018\)](#), [Phan \(2017\)](#), [Solovida and Latan \(2017\)](#) and [Ferreira et al. \(2010\)](#). This study used the weighted least squares mean and variance (WLSMV) adjusted estimator available through the software Mplus Version 8.3 because the outcome variable is ordinal, i.e. extent of EMA use. [Lei and Wu \(2012\)](#) and [Muthén and Muthén \(2009\)](#) recommended using the WLSMV estimation method when the outcome variable is ordinal, such as those measured by a Likert scale and/or in cases during which the data is not normally distributed. The WLSMV estimator is referred to as 'diagonally weighted least squares' in the literature ([Li, 2016](#); [Muthén and Muthén, 2009](#)). It is the default estimator in Mplus software for analysing a model with an ordinal outcome ([Muthén and Muthén, 2009](#); [Wang and Wang, 2012](#)). The SEM of the survey data consists of two main stages that are: (i)

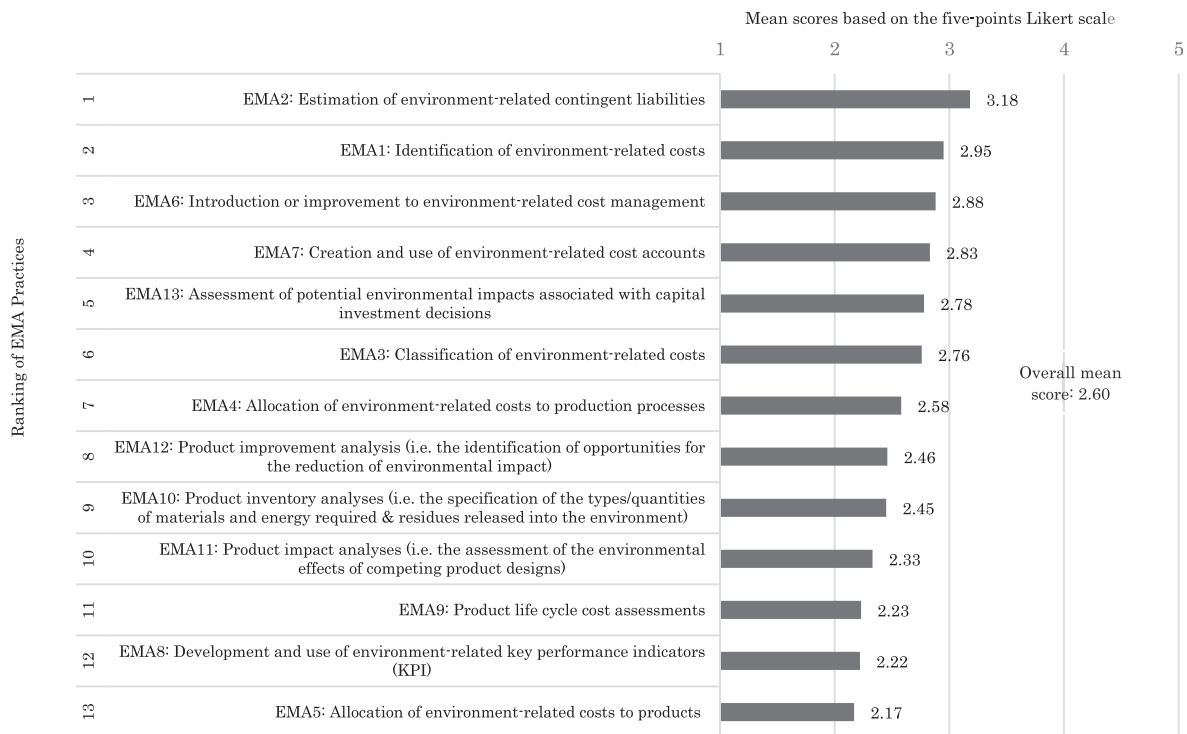


Fig. 1. EMA practices ranked on the basis of their mean scores.

confirmatory factor analysis (i.e. measurement model), and (ii) path analysis (i.e. structural model) ([Hair et al., 2013](#); [Kline, 2011](#)).

In a confirmatory factor analysis, the measurement model is tested for validity by using three tests: goodness of fit indices,

Table 4
Convergent validity.

Constructs (latent variables)	AVE (>0.50)	Composite Reliability (>0.70)	Item ID (Observed Variables)	SFL (>0.50)
Extent of EMA use	0.74	0.97	EMA1	0.846
			EMA2	0.774
			EMA3	0.881
			EMA4	0.785
			EMA5	0.835
			EMA6	0.94
			EMA7	0.923
			EMA8	0.847
			EMA9	0.869
			EMA10	0.926
			EMA11	0.883
			EMA12	0.93
			EMA13	0.73
Technological capabilities	0.70	0.90	TR1	0.597
			TR2	0.917
			TR3	0.831
			TR4	0.947
EFHRM	0.70	0.94	HR1	0.665
			HR2	0.883
			HR3	0.847
			HR4	0.811
			HR5	0.887
			HR6	0.895
			HR7	0.844
Coercive isomorphism	0.70	0.96	CI1	0.727
			CI2	0.801
			CI3	0.862
			CI4	0.864
			CI6	0.796
			CI7	0.729
			CI8	0.967
			CI9	0.92
			CI10	0.902
			CI11	0.732
			Normative isomorphism	0.80
NI2	0.876			
Mimetic processes	0.78	0.93	MI1	0.977
			MI2	0.852
			MI3	0.798
			MI4	0.892

convergent and discriminant validity tests (Hair et al., 2013; Kline, 2011). The measurement model of this study achieved good levels of goodness of fit indices as follows: the value of χ^2/df was 2.64⁽⁵⁾, CFI was 0.970⁽⁶⁾, TLI was 0.967⁽⁷⁾, and RMSEA⁽⁸⁾ was 0.088. Table 4 shows the convergent validity tests as follows: the standardised factor loadings (SFL) and the average variance extracted (AVE) test were more than the cut-off threshold value of 0.50 as required for all observed and latent variables. The composite reliability values were more than the cut-off threshold value of 0.70 as it should be for all latent variables (Fornell and Larcker, 1981; Hair et al., 2013). In the discriminant validity tests, the square root of the average variance extracted value of every single latent variable

should be greater than its correlation estimates with other constructs (Fornell and Larcker, 1981; Hair et al., 2013). This was achieved in the discriminant validity tests as illustrated in Table 5. The exception was coercive isomorphism which was very marginally above EMA (=0.002). Also, normative isomorphism was marginally above coercive isomorphism (=0.02). Overall, satisfactory discriminant validity was achieved for all constructs.

In path analysis, a structural model is being tested for the dependency relationship between the set of independent and control variables on one side with the dependent variable on the other side (Hair et al., 2013). The goodness of fit was very good with the following outcomes: $\chi^2/df = 1.963$, CFI = 0.950, TLI = 0.947 and RMSEA = 0.067. The value of R-squared indicates that the overall model explained 83% of the variance during the EMA use with a significant p-value, which indicates robust accuracy and the power of the analysis. The control variables such as firms' age and nationality were coded into multiple dummy variables in order to include them in the path analysis. However, one category of each of the control variables must be used as a 'reference category' for the other categories of the dummy variables (Hair et al., 2013; Wang and Wang, 2012). The remaining categories of the dummy

⁵ χ^2/df must be less than the cut-off threshold value of 3 (Bagozzi and Baumgartner, 1994; Hair et al., 2013; Schermelleh-Engel et al., 2003).

⁶ CFI must be more than the cut-off threshold value of 0.90 (Hair et al., 2013; Wang and Wang, 2012).

⁷ TLI must be more than the cut-off threshold value of 0.90 (Hair et al., 2013; Wang and Wang, 2012).

⁸ RMSEA must be less than the cut-off threshold value of 0.1 (Browne and Cudeck, 1993; MacCallum et al., 1996).

Table 5
Discriminant validity.

	AVE	EMA	TR	EFHRM	CI	NI	MI
Extent of EMA use	0.74*	0.861**					
Technological capabilities	0.70*	0.657	0.834**				
EFHRM	0.70*	0.819	0.642	0.836**			
Coercive isomorphism (CI)	0.70*	0.863	0.593	0.814	0.834**		
Normative isomorphism (NI)	0.80*	0.810	0.607	0.835	0.854	0.897**	
Mimetic processes (MI)	0.78*	0.785	0.636	0.789	0.812	0.816	0.882**

Notes: (a) Ave*: the average variance extracted; (b) Square roots of AVE values**; (c) the rest of the values represent correlation estimates of latent variables copied from the covariance matrix generated by Mplus software; (d) TR = Technological capabilities; (e); (f) NI = normative isomorphism; (G) MI = mimetic processes; (H) CI = coercive isomorphism.

variables will be 'interpreted in relation to their reference category' (Hair et al., 2013, p. 178). This reference category will not be listed in the output of the analysis (Hair et al., 2013; Wang and Wang, 2012). Saudi Arabia was used as the reference category for the other nationalities because it represents most of the surveyed firms' nationalities (36%), and AGE4 (older than 21 years) served as a reference category because it represents most of the surveyed firms' ages (63%).

Fig. 2 and Table 6 show that "coercive isomorphism (H3)" was the predictor variable with a unique contribution to the extent that EMA was used as a dependent variable. This is because it had the highest standardised coefficient value of 0.356 and a p-value of 0.000. The second strongest predictor variable was "EFHRM (H1)" with a standardised coefficient value of 0.145 and a p-value of 0.004. The third strongest predictor variable was "technological capabilities (H2)" resulting in a standardised coefficient value of 0.088 and p-value of 0.020. However, normative isomorphism (H4) and mimetic processes (H5) did not contribute to the extent of EMA use in the selected firms. In other words, hypotheses 1, 2 and 3 were accepted while hypotheses 4 and 5 were rejected.

6. Discussions

The present study found that EFHRM positively influenced the extent of EMA use in the selected firms. This outcome matches those observed in earlier research which found that EFHRM enhances aspects of corporate environmental management, such as implementation of EMS and green supply chain management (Jabbour et al., 2010; Nejati et al., 2017; Wagner, 2013). Also, this finding is consistent with previous research, which has emphasised that a lack of qualified human resources can undermine the implementation of EMS or other environmental initiatives (Berrone and Gomez-Mejia, 2009; Bowen, 2002; Waxin et al., 2017). The supporting evidence provided by this study can be explained by the theory of resource slack. Specifically, the availability of adequate human resources boosts environmental initiatives and their related tools, such as EMA practices. Implementing environmental initiatives requires managerial and employee commitment and imposes high costs, since the generation of outcomes related to such initiatives requires continuous research and development or environmental equipment acquisition; these activities have to be paid for (Mokhtar et al., 2016). Hence, the seven aspects (recruitment, training, performance appraisal, rewards, teamwork, employee empowerment and management support) of EFHRM associated with accountants and related personnel who deal with EMA practices should be assessed carefully by management in order to promote these practices. Therefore, the lack of expertise when implementing EMA practices constitutes a barrier for this study's sample.

This issue of lack of expertise can be solved in a similar way to that established by governments of developed countries a long time

ago, when they embraced EMA practices which has not been done by the selected MENA countries. For instance, the Environmental Protection Agency in the USA promoted a long-running EMA project for business decision-making (Savage et al., 2001). In Japan, two government ministries have taken the initiative to promote guidelines for EMA, which successfully resulted in companies adopting EMA (Bennett et al., 2003). Hence, governments in the selected MENA countries should resolve the lack of expertise in EMA by developing EMA guidance documents for firms, conduct meaningful workshops and training initiatives in cooperation with non-government partners. Savage et al. (2002) discussed several cases of EMA promotion in developed countries (e.g. Australia, Austria, USA and Netherlands) and indicated that governments mostly promote EMA with the assistance of many non-government partners. These include individual industrial firms, accounting associations, industry associations, universities, research & consulting firms, financial institutions, etc. This is because non-government partners can provide the expertise needed for EMA adoption. This point relates to the lack of human expertise to implement environmental management and EMA in businesses with the right form of coercive isomorphism. The correct type of coercive isomorphism goes beyond symbolic legislation and provides guidance to firms, for example guidance relating to how environmental management and EMA can be implemented properly and adequately.

This study yielded supporting evidence that technological capabilities acted as a positive determinant of the extent of EMA use in the selected firms. Our findings are consistent with the findings in Chuang and Huang (2018) showing how technology can influence environmental performance; and as revealed by Malaquias et al. (2016), technology influences CSR. The evidence provided by this study is supported by the theory of resource slack. Similar to financial slack, skilled human resources and technological capabilities can help implement or improve an environmental strategy, department or system, which can act as a buffering mechanism against environmental demands by gaining the environmental legitimacy that lessens these demands (Bowen, 2002). Together with financial and human resources, technological capabilities are essential to carry out corporate environmental strategies (Darnall and Edwards, 2006; Mesmer-Magnus et al., 2012; Mokhtar et al., 2016). In terms of information technology, it 'provides a necessary platform for firms to develop their management accounting systems and strategy' (Hyvonen, 2008, p. 30). In terms of manufacturing technology, the more it progresses, the more advanced accounting practices are needed to follow the progression of technology, to be precise and to follow the costs related to the manufacturing process (Haldma and Lääts, 2002). Both information and manufacturing technology effect EMA practices, since they are advanced management accounting practices (Bennett and James, 1998; Langfield-Smith et al., 2015; Jasch and Savage, 2005). Thus, this study contributes to the contention that there are

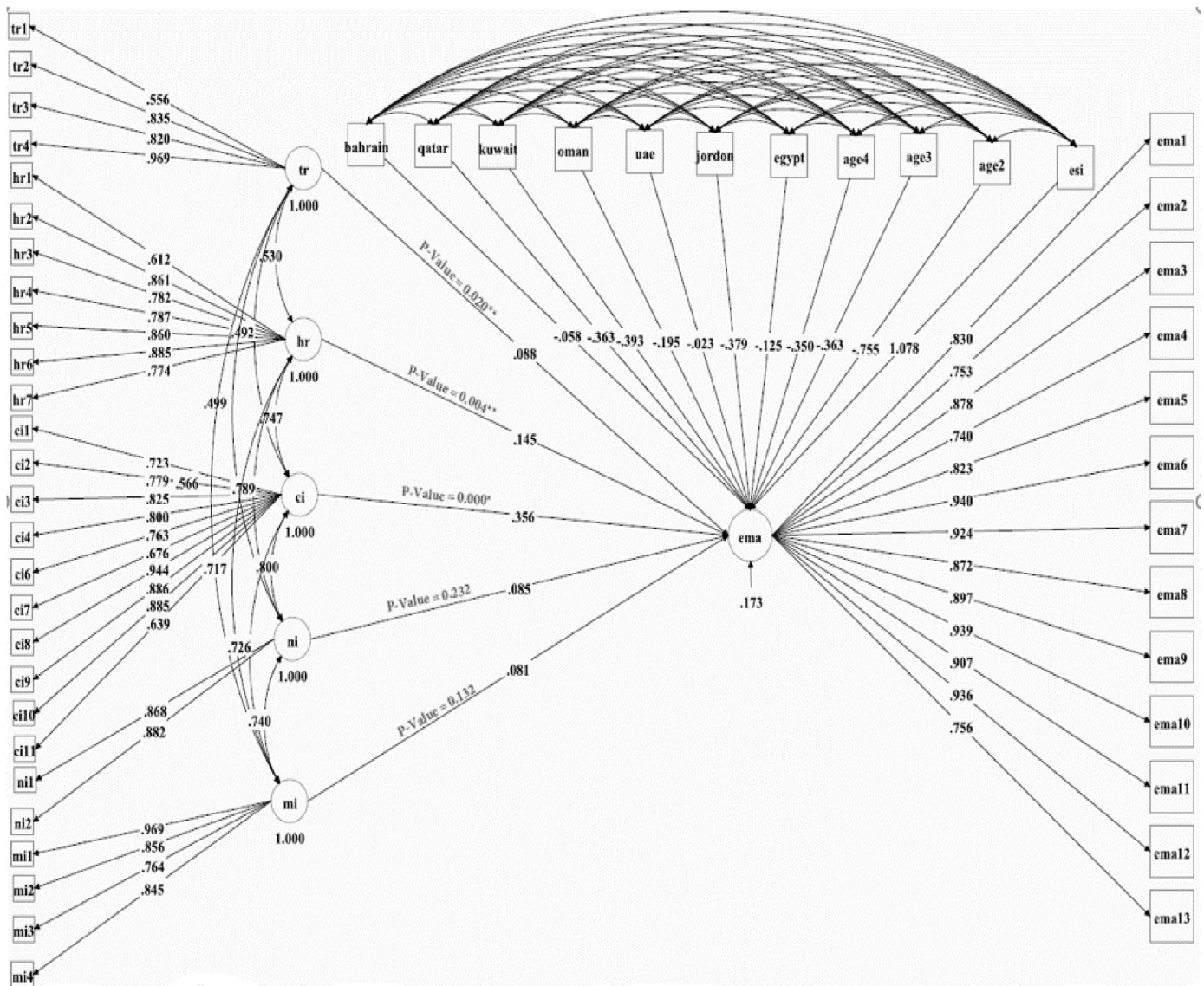


Fig. 2. Diagram of the structural model (Path analysis).

Table 6

Structural model results.

Predictors	Standardised Coefficients (Est.)	S.E.	Est./S.E.	P-value
Independent variables (Latent variables):				
H1. Technological capabilities	0.088	0.038	2.317	0.020*
H2. EFHRM	0.145	0.050	2.912	0.004**
H3. Coercive isomorphism	0.356	0.054	6.543	0.000**
H4. Normative isomorphism	0.085	0.071	1.196	0.232
H5. Mimetic processes	0.081	0.054	1.508	0.132
Control Variables:				
Environmental sensitivity of industry	1.078	0.102	10.591	0.000**
AGE2: 6–10 years	−0.755	0.328	−2.299	0.022**
AGE3: 11–15 years	−0.363	0.193	−1.879	0.060
AGE4: 16–20 years	−0.350	0.140	−2.509	0.012*
Egypt:	−0.125	0.171	−0.730	0.466
Jordan:	−0.379	0.174	−2.178	0.029*
United Arab Emirates	−0.023	0.204	−0.114	0.909
Oman	−0.195	0.231	−0.846	0.398
Kuwait	−0.393	0.218	−1.806	0.071*
Qatar	−0.363	0.711	−0.511	0.610
Bahrain	−0.058	0.321	−0.180	0.857

Notes: (a) Dependent Variable: Extent of EMA use; (b) **p < 0.01; (c) *p < 0.05; (d) P-value is Two-tailed; (e) R-squared (R²) is 0.83; (f) S.E. is standard error; (g) Est. Is standardised coefficient.

important positive links between technology and EMA practices.

The lack of environmental information offered by technology is critical to the implementation of EMA practices by the investigated firms. Rapid advances in IT along with the increasing amounts of environmental information, has made it necessary for organisations to use systems that manage all environmental information more efficiently (Graham et al., 2003; Worboys et al., 2001). Hence, the promotion of an effective EMS can help to overcome this problem. An EMS consists of structuring, planning, responsibility, procedures, processes and resources, to develop, adapt, achieve, review and sustain environmental policies (Wilmshurst and Frost, 2001). Several studies have found EMS to be significantly associated with use of EMA practices, such as Phan (2017), Christ (2015), Ribeiro and Aibar-Guzman (2010) and Hyršlová and Hájek (2006). Nevertheless, firms' use of EMS in the selected MENA countries is still in its infancy according to some studies (Wahba, 2010; Migdadi and Elzqaibeh, 2018; Kadasah, 2013; Mariotti et al., 2014; Alsiary, 2015). The lack of government support and incentives is in fact a major barrier to adopting EMS in this part of the world (Massoud et al., 2010; Wahba, 2010; Kadasah, 2013; Mariotti et al., 2014; Alsiary, 2015). Therefore, it is vital to promote governments' acceptance of EMS in this study's sample in order to make EMA practices viable. Governments are now beginning to recognise the benefits of businesses adopting technology for environmental management and EMA. It is defined as eco-innovation and has now been implemented in some Asian countries backed with government investment (Jang et al., 2015).

The present study found that coercive isomorphism, either as formal or informal pressure coming from different types of stakeholders (e.g., governments, local communities, media, customers, environmental groups, labour unions, etc.), strongly and positively influences EMA use in firms. The overall results support the findings of other studies, such as those of Chaturangani and Madhusanka (2019) and Jamil et al. (2015), which indicated that coercive isomorphism positively affects the extent of EMA use. The result of our study supports the concept of coercive isomorphism in the NIS perspective of institutional theory. This concept 'asserts that coercive pressures exerted by the government and legalisation can compel organisations to make organisational changes and adopt certain attributes to gain legitimacy for their operations' (Jamil et al., 2015, p. 625). In terms of EMA practices, coercive isomorphism makes possible the implementation of new techniques owing to the necessity to comply with environmental regulations and standards (DiMaggio and Powell, 1983).

In the absence of governmental pressure, organisations are less likely to use EMA practices (Chang, 2007). Nevertheless, it must be the right type of coercive pressure, specifically from governments in the MENA region. It will exert a positive impact on the intention and willingness of decision-makers in the selected firms to use EMA practices. Although coercive isomorphism did positively affect the extent of EMA use, the overall extent in the chosen sample was found to be low as illustrated in Fig. 1. This means that coercive pressure is evident in the extent of EMA use, but it is minimal at best.

Thus, coercive pressure from governments is not enough to achieve adequate environmental management and EMA practices by businesses, even if they are large corporations. The examples of legislation mentioned earlier in the article are currently limited in their scope. They provide general environmental standards, but practical enforcement is not currently being done (Srivastava, 2019). Through our findings we suggest that governments in the MENA region should enforce the rules and invest more in the process. They should promote eco-innovation as an attractive option for businesses by providing financial incentives, for instance

eco-innovative subsidies.

The listed firms in all of the selected MENA countries experience fewer environmental requirements and less promotion compared with listed firms in Germany and Japan as published by the Sustainable Stock Exchanges Initiative (2019). Environmental requirements for listed firms in all of the selected MENA countries are comparatively weaker since firms are not required to undertake sustainability reporting as a listing rule. Furthermore most of them lack guidance on sustainability reporting and environmental accounting (Sustainable Stock Exchanges Initiative, 2019).

In relation to normative isomorphism, the external training at educational and professional institutions in addition to acquiring memberships of accounting associations did not have an impact on EMA use in the selected firms. Compared to other EMA research, this result is supported by a similar finding by Jamil et al. (2015). Also, the finding was contrary to the NIS perspective of the institutional theory that underpins this relationship. The statistically insignificant result, based on the perception of participants, suggests there is a lack of environmental education in the curriculum. Moreover, the firms' environmental practices lack any influence from their membership of accounting associations (e.g., SOCPA, ACCA or CIMA). Therefore, if key executives are not exposed to EMA through formal or professional education, they might make a decision relating to environmental aspects based on using existing (traditional) accounting; hence, the likelihood that they would manage environmental costs through EMA practices is much less (Chang, 2007). Universities and accounting associations in the MENA countries should integrate environmental accounting in general, and EMA in particular in their accounting curricula. This would increase the knowledge and environmental awareness among accountants and other cohorts, and therefore, EMA practices will have better chance to work.

In the current study, mimetic processes did not significantly influence corporate EMA use, contrary to prior studies (Chaturangani and Madhusanka, 2019; Jalaludin et al., 2011; Jamil et al., 2015). This outcome contradicts the NIS perspective of institutional theory, which emphasises that mimetic processes entail that when an organisation is confronted with uncertainties, it tends to imitate others in order to maintain competitiveness and minimises or even avoid unexpected and adverse outcomes (DiMaggio and Powell, 1983; Yang, 2012). This study contends that imitating competitors, counterparts, multinationals, and leaders in the industry does not lead to EMA practices being utilised by the selected firms. To improve the influence of mimetic processes on corporate environmental management tools (e.g. EMS, EMA practices), MENA governments should introduce policies, regulations and strategies that encourage the spread of corporate environmental management and sustainable development. Enhanced mimetic processes will in return improve the use of corporate environmental management tools. According to Masocha and Fatoki (2018, p. 11) 'knowledge on the influence of mimicry in sustainable development practices can be utilised to formulate procedures and practices that indirectly encourage adoption of sustainability'. For instance, governments across the selected MENA countries can issue guidance documents on the implementation of EMS-ISO 14001 and EMA practices. They can also offer government contracts, tax deductions for firms that use such environmentally friendly systems and practices. Only then will firms start imitating each other by adopting these systems and practices.

7. Conclusion

The findings revealed that EMA practices in the selected firms were at a low level, but a few individual EMA practices were used moderately. It was found that more basic and general EMA practices

were used to a moderate extent while the most advanced and more sophisticated EMA practices were used to a low extent. Key implications from our study are that environmental management and EMA adoption at sophisticated and advanced levels need to occur by introducing modern technologies and by enhancing EFHRM. MENA governments need to undertake these actions as a form of coercive isomorphism while improving enforcement of environmental legislation.

To boost coercive regulatory pressure, the following recommendations should be considered by the regulatory bodies of the selected MENA countries. Firstly, environmental laws should be updated to become more effective in the form of fines, penalties and enforcement mechanisms. Secondly, updated and uniform environmental laws should cover firms that may not directly affect the environment (least environmentally sensitive) but play a key role in investing funds. Thirdly, the authorities in charge of capital markets in the selected MENA countries should require environmental reporting as a mandatory listing rule. To encourage the selected firms, the following recommendations should be considered by the regulatory bodies: (1) capital markets must be mandated to provide guidance documents and training on EMA practices; (2) governments should outsource experts who can help with implementing EMA practices, such as accounting associations, industry associations, education institutions and research & consulting firms; and (3) governments should provide financial incentives in terms of business contracts, tax deductions or exemptions, subsidies and invest in eco-innovation.

For future research, we suggest qualitative approaches such as case studies, in-depth interviews and experimental designs, may provide in-depth and detailed knowledge that can further strengthen or add insights on the findings of our research. Case studies of successful government initiatives relating to high quality environmental legislation, legislation enforcement and eco-investment as well as education should be researched. In this way the findings can be shared to provide evidence of a better government coercive isomorphism, for improved business environmental performance.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. The primary author would like to acknowledge that this study was a part of his PhD studies at RMIT University, which was sponsored by a scholarship provided by the government of Saudi Arabia. Nevertheless, the selection of the topic of this study was entirely based on the desire of the primary author.

CRedit authorship contribution statement

Nasser Asiri: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Writing - original draft, Visualization. **Tehmina Khan:** Supervision, Writing - review & editing. **Michael Kend:** Supervision, Writing - review & editing.

Appendix A. Supplementary data

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