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تأثير تطور تكنولوجيا المعلومات على الممارسات المحاسبية الخضراء لتعزيز استدامة المنظمات العراقية: إطار مفاهيمي

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ملخص الدراسة:

في الاونة الاخيرة، أصبحت الاستدامة البيئية والاقتصادية والاجتماعية اعتبارًا تنظيميًا مهمًا (GLRI,2005). وهناك اهتمام متزايد بحماية البيئة على جميع المستويات. يتضح هذا بعد إصدار اللوائح البيئية في معظم البلدان، ولكن مع تكثيف البحث عن حلول جديدة لمنع التدهور البيئي، الا ان اغلب الحلول التنظيمية وتنفيذها من قبل الهيئات العامة قد عفا عليها الزمن. لذلك ، يمكن أن يلعب الاقتصاد دورًا مهمًا فيما يتعلق بالقضايا البيئية (حميد ، 2002). إن إدراج البعد البيئي في نظام المحاسبة التقليدي على جميع المستويات (شركة ، قطاع ، محافظة ، على مستوى الدولة) سيؤدي إلى مؤشرات اقتصادية معدلة تمكن المستخدمين المختلفين على جميع المستويات من اتخاذ قرارات سليمة تدعم التنمية المستدامة (Jenkin, Webster & McShane, 2011) . ومن أجل فهم أفضل لذلك تقترح هذه الدراسة إطارًا مفاهيميًا للتكامل بين الممارسات المحاسبية الخضراء القائمة على تكنولوجيا المعلومات لتعزيز استدامة المنظمات العراقية والعناصر ذات الصلة بتطور تكنولوجيا المعلومات والتي من الممكن ان تؤثر في العمليات والاجراءات المحاسبية وفي انظمة المعلومات المحاسبية لدى منظمات الاعمال.

الكلمات المفتاحية: نظم المعلومات المحاسبية الخضراء ، تطور تكنولوجيا المعلومات ، الاستدامة

The Influence of Information Technology Sophistication on Green Accounting Practices to Enhance Sustainability of Iraqi Organizations: A Conceptual Framework

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Abstract:

Recently, environmental, economic and social sustainability has become an important regulatory consideration (GLRI, 2005). There is a growing interest in protecting the environment at all levels. This is evident after the issuance of environmental regulations in most countries, but with the intensification of the search for new solutions to prevent environmental degradation, most of the regulatory solutions and their implementation by public bodies have become obsolete. Therefore, economics can play an important role in relation to environmental issues (Hamid, 2002). The inclusion of the environmental dimension in the traditional accounting system at all levels (company, sector, governorate, nationwide) will lead to adjusted economic indicators that enable different users at all levels to make sound decisions that support sustainable development (Jenkin, Webster & McShane, 2011). In order to better understand, this study proposes a conceptual framework of Green AIS practices based on IT to enhancing the sustainability of Iraqi Organizations and it related elements of IT Sophistication that might influence on green AIS practices.

Keywords: green accounting information systems, information technology sophistication, sustainability

1. Introduction:

In the last decades, environmental sustainability has become a significant organizational consideration (GLRI, 2005). There is an increasing interest in environmental protection at all levels (Hamid, 2002). The inclusion of environmental dimension in the traditional accounting system at (company, sector, and governorate, nation-wide) will result in an adjusted economic indicators which will enable different users at all levels to take sound decisions that support sustainable development (Jenkin, Webster& McShane, 2011). However, environmental accounting has many meanings and uses. Environmental Accounting can support natural resource accounting at macro level, ecological accounting at local administration level and at micro level related to financial accounting, cost accounting or managerial accounting (Hamid, 2002).

However, as organizations leverage their productivity with an ever increasing rate of information technology and information system (IT/ IS) use, they often become part of the larger problem of environmental sustainability. The use of IT/S is exploding, growing two times faster than the gross world product (Siegler, Gaughan&Linderholm, 2008), and consuming large fractions of

business' energy costs. In most cases, more than half of this energy is wasted by inefficient technologies, poorly designed systems, or uninformed behaviors. IT/ IS can have a detrimental influence on the environmental footprint of organizations (Siegler et al., 2008).

ITs have short product life spans (e.g., laptops, 3–4 years; networks, 5–7 years); their manufacture and disposal have resulted in toxic hotspots; and a large portion of organizations' electricity costs (and concomitant greenhouse gas emissions) is due to IT energy use (e.g., office buildings, 26%; data centers, 95%). Spending on IT has important implications for the environment .However, environmental issues underlying IT/S often have no clearly defined ownership in organizations (Siegler et al., 2008) and the IT/ IS function is often not considered by organizations in their assessment of their environmental footprints (Huang, 2008)

The global trend demands a technology. The employment of information technology (IT) in accounting is vastly exercised and has turned into an everyday routine, in which the accounting and financial operations can no longer be conducted efficiently without the use of IT. In contrast to harmful effects on the environment, 'Green' IT/S can have positive impacts, with the potential to reduce global emissions by 15% (The Climate Group, 2008). Green IT/S refers to information technology and system initiatives and programs that address environmental sustainability (e.g., Siegler et al., 2008). The effects of Green IT/ IS, which have the potential to be substantial, can be either direct – by reducing negative IT impacts on the environment – or indirect – using IS to support other business initiatives in reducing their negative environmental impacts. The IT and IS components of Green IT/ IS have been distinguished based on their focus and impact on the environment. 'Green IT', which addresses energy consumption and waste associated with the use of hardware and software, tends to have a direct and positive impact (Watson, Boudreau, Chen, & Huber, 2008).

On the other hand, the term "green information systems" refers to the development and use of information systems to support or enable environmental sustainability initiatives and, therefore, tends to have an indirect and positive impact (Watson et al., 2008).

However, regardless of the deficiencies in the Iraqi Accounting Information Systems (AIS) and its role in reducing the adverse environmental impacts of business organizations, it has not been fully realized. The trend of the global economy now requires digital transformation and the use of technology. Where the employment of information technology (IT) in accounting work is widely practiced and has become a daily routine, the use of information technology is increasing exponentially, growing at twice the rate of global gross product (Siegler, Gaughan&Linderholm, 2008), and it is no longer possible to Conducting accounting and financial operations efficiently without using information technology. Previous research has shown that green accounting practices in Iraqi organizations are still relatively low in application. Therefore, it has become necessary to integrate green accounting practices and information technology within business organizations to enhance sustainability.

Moreover, little research has been done to highlight the impact of the development of information technology on green accounting practices in business transactions and only a few

studies have been published (to the researcher's knowledge) related to green accounting information systems. However, it remains to be seen how the evolution of information technology affects green accounting practices to enhance the sustainability of Iraqi organizations in their day-to-day business operations. In order to better understand that, this study proposes a conceptual framework for the integration of green accounting practices based on information technology to enhance the sustainability of Iraqi organizations and the elements related to the development of information technology that can affect the accounting processes and procedures and the accounting information systems of business organizations.

2.Green Accounting Information System:

An important function of environmental accounting is to bring environmental costs to the attention of corporate stakeholders who may be motivated to identify ways of reducing or avoiding those costs while at the same time improving environmental quality (EPA Victoria, 2011).Watson, Boudreau, Chen, and Huber, (2008) 'Green IS', refers to the development and use of information systems to support or enable environmental sustainability initiatives and, thus, tends to have an indirect and positive impact. According to Vietnamese Central Institute on Economic Research and Management, the "green accounting" is an accounting system that deducted the depletion of natural resources and the cost of environmental degradation, which is used to assess actually the quality of economic growth (Giannetti, 2013).

As we know, in many articles on International Accounting Standards (IAS), the financial accounting theories have identified and recorded the tangible fixed assets and intangible assets with the principle of lower of historical cost and market value or current value. However, the above theories have not evaluated the usage of natural resources and environment as well as losses in the income of the organizations, which arise due to the decline in natural capital. In addition, up to now, many environmental resources, such as water and air, are continued to be regarded as the free natural products, so they do not appear in the corporations' financial statements.

In the activities related with financial accounting, the production and distribution of products or services would present many different requirements that arise in the process of production and business activities, such as direct materials, direct labor, factory overhead expenses, selling expenses, general administrative expenses, as well as enterprise research and development expenses. In other words, environmental costs are expenditures in a part of production costs and administration but are not recorded in specific accounts. They are viewed as general management costs in the company (Yusoff, Othman, & Yatim, 2013).

From that, the theory of environmental accounting seeks to change, adjust, and reflect the above parts onto the T-account by adding some items to revenue and environmental costs on profit and loss statements of the business's reports. In doing this process, accountants should focus firstly on the income from waste disposal and income from the recycling of manufactured goods. After that, accountants have to mention and calculate the costs of remedying environmental damages from waste gas or oil spill caused by infection of plant emissions. The relationship between

green natural environment and financial accounting can be done by adopting the environmental management information system (EMIS), which is considered necessary to link the environment with effective economic performance of enterprises.

The application of the green accounting system will help the companies make decisions to solve the environmental problems, such as allocation of environmental costs, taxes for using the natural resources, or how to record the environmental expenses into the enterprise journals. So, users within the enterprises are persons who receive the information from green accounting system (such as individuals who are responsible for managing and administering the company's funds). Besides that, the internal users and the recipients may also be people who are outside the company (such as investors, creditors, customers, tax authorities, citizens). Both the above users are persons who are interested directly or indirectly in the environmental information. All these people need reliable information to (Huy, 2014):

1. Determine the effects from environment as well as additional expenses which company applied into the manufacturing processes with environmental factors.
2. Estimate the environmental costs in the overall production costs that businesses spend.
3. Determine the chances about the environments for creation of the net income to the company.
4. Implement and maintain an EMIS with a combination between the environment and other aspects in management activities.
5. Recognize the costs and future productivity when the EMIS model is applied.
6. Establish, build up the cost accounting methods, and evaluate the environmental products.
7. Design a process of manufacturing environmental goods and services in the business.

After considering the income and expenses from the environment in general, managers must identify and be aware that environmental costs are usually included in various parts of the accounting system and this is a difficulty to collect all the "green information" needed for decision-making. Since then, the companies must find the approaches to achieve the environmental goals, such as reducing green costs, increasing income, and improving the output environment. Last, businesses need to identify back, measurement, and presentation of the environmental costs generated by the activities of environmental characteristics (Gray, Bebbington, & Walters, 1993).

Hence, under the current trends, companies will tend to separate various costs based on types of products, processes, or activities. Therefore, the expected activities affected by environmental accounting will beconducted to classify costs as "internal" or "external". With the methods mentioned above, the accountants of green accounting will help to understand environmental effects and manage, analyze, and record the environmental costs onto the company's accounting books. In addition, the system of green accounting also supports companies for making many solutions of investment in the projects related with environment in an effective approach.

3. Information Technology Sophistication

The sophistication term is closely associated with the field of IT. The Oxford Advanced Learner's Dictionary (2008) defined sophistication as the quality of being sophisticated of machinery, technology or computer-based system. Essentially in the IT area, IT sophistication is not exclusively subjected to the physical or the existence of technologies which impact the organization finally, but IT sophistication is comprehensive in nature. Initially, IT or system sophistication term has been used by Richard Nolan in the 1970s in order to introduce the Stages of Growth Model. Even though the model has been criticized, it has been able to explain the growth of IT in a business and finally characterizing organizational technology. Hence, this has sparked researchers to streamline the concept of IT sophistication in other disciplines.

In 1992, Raymond and Pare have managed to define IT sophistication to a multidimensional construct that refers to the nature, complexity and interdependence of two important perspectives which are IT use and IT management (Raymond, Pare & Bergeron, 1995). In a broader scope, technology used and the IT applications portfolio must be aligned with organizational structures and management aspect to contribute a positive IT impact. Raymond and Pare (1992) emphasized on four IT sophistication dimensions, namely technological sophistication, informational sophistication, functional sophistication, and managerial sophistication.

Firstly, technological sophistication refers to the diversity of technologies used by the organization that entails hardware, software, processing mode, and type of operation. Secondly, informational sophistication represents the nature of applications portfolio and the degree of integration of applications which apparently influences the information content. Thirdly, functional sophistication refers to structural aspects including IT or the information system (IS) role, the position of the IT/IS function, and user participation. Lastly, managerial sophistication reflects the mechanism employed to plan, control and evaluate present and future IT/IS applications which take into account the top management support, evolution of IT, IT investment, as well as organizational objectives .

Focusing on the impacts of IT sophistication, Mohd-Daud and Mohamed (2008) posited that IT usage is able to improve both the performances of individuals and organizations to achieve of sustainable development. This is aligned with Ibrahim and Lam (2012) who believed that IT/IS is useful to enhance effectiveness and business productivity. Burca, Fynes, and Brannick (2006) have significantly demonstrated that IT sophistication has a direct effect on organizational performance. In fact, IT sophistication that focuses on IT aspects, namely technical, informational, functional and managerial, has impacted positively on IT alignment. IT alignment is the situation where business strategies and IT strategies are aligned (Hussin, King, & Cragg, 2002).

4. Information technology sophistication and Green Accounting Information System

For over 20 years, the rapid development of technology has had a huge impact on the accounting development. The introduction of accounting information system (AIS) that has the characteristics of automation or computerization is able to strengthen accounting practices which

were once considered as a conservative industry. Hurt (2008) has defined AIS as a set of interrelated activities, documents and technologies designed to collect data, process it, and report information to a diverse group of internal and external decision makers in organizations. Abu-Taber, Alaryan and Abu-Haija (2014) who quoted from Haddad and Atma (2009), underlined that AIS consists of seven important elements which are people, procedures and instructions, data, software, infrastructures, internal control, and security.

It is believed that the integration of those elements allows generating accurate, relevant, timely information nevertheless comprehensive information. The word "technologies" embedded in the AIS term is sufficient to reflect how close computer-based accounting system and IT sophistication are. In fact, Ismail (2009) interchangeably used the AIS sophistication to represent IT sophistication in his study. The author focused on technological sophistication and found that AIS sophistication has a positive relationship towards AIS effectiveness. AIS effectiveness is measured based on Delone and MacLean Model of IS success which was developed in 1992. Previously, limited to IT use in exploring the "fit" between AIS requirements and AIS capacity or AIS alignment, Ismail and King (2007) posited that AIS alignment is associated to informational sophistication but not to technological sophistication.

Moreover, as the use of technology in Green accounting is able to enhance environmental information processing capabilities, thus, affect the quality of accounting information, Al-Eqab and Azizi (2011) empirically found that technological, informational, functional, and managerial sophistication has a positive relationship to AIS design. In another view, Edison, Manuere, Joseph, and Gutu (2012) postulated that financial constraints (managerial sophistication) strongly influence the non-adoption of AIS by small medium enterprises (SMEs) in Chonhoyi. In addition, management commitment is found to have a direct relationship with AIS but not accounting information quality (Al-Hiyari, Al- Mashergy, Nik-Mat &Alekam, 2013). Clearly, AIS sophistication is concerned on both usage and management. Besides, to characterize the company's AIS level, its impact on a company's performance is persisted as the main concern.

From the above literature discussion, the relationship between IT sophistication and Green AIS has not been investigated before.

Furthermore, this study differs from previous studies in terms of investigating the relationship between IT sophistication (technological sophistication, informational sophistication, functional sophistication, and managerial sophistication) and Green AIS among Iraqi organizations under Iraqi environment. Based on this, the following propositions are formulated for this construct:

P1. There is a positive relationship between IT sophistication and Green AIS Practices in Iraqi organizations to achieve of sustainable development.

P1-a: There is a positive relationship between technological sophistication and Green AIS Practices in Iraqi organizationsto achieve of sustainable development.

P1-b: There is a positive relationship between informational sophistication and Green AIS Practices in Iraqi organizations to achieve of sustainable development.

P1-c: There is a positive relationship between functional sophistication and Green AIS Practices in Iraqi organizations to achieve of sustainable development.

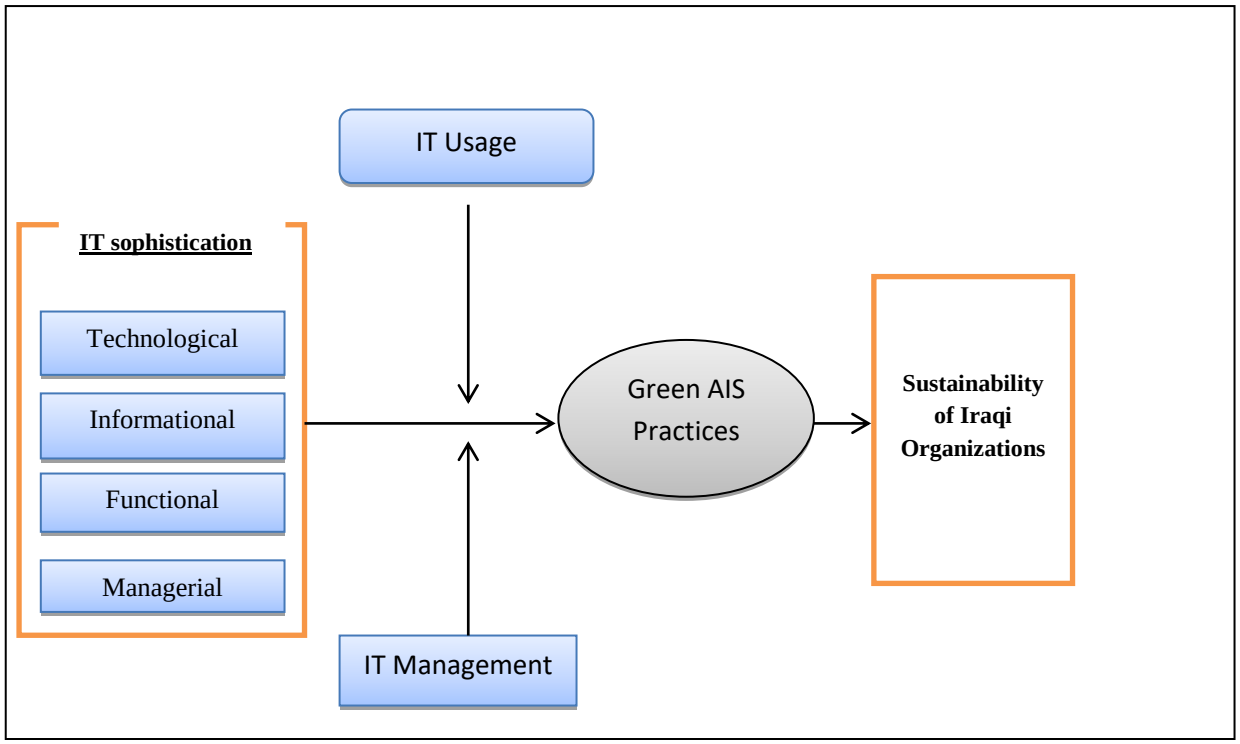
P1-d: There is a positive relationship between managerial sophistication and Green AIS Practices in Iraqi organizations to achieve of sustainable development.

5. Conceptual Framework

According to Sekaran and Bougie (2010) a conceptual framework has been developed in a logical manner, in order to give a vision for the relevant variables and with the problems identified by conducting interviews and observations and a review of previous literature. According to Guba and Lincoln (1994) the development of the conceptual framework of the research is an important step in the methodology of scientific research because it clearly defines the contributions of the pluralist and relativist view in fact, Cavana, Delahaye and Sekaran (2001) argued that the framework study explains the relationships between variables that have been identified to solve the problems. In addition, the authors claimed that the logical relationships between the variables supported through the previous research in the problem area.

This study is trying to assist the Iraqi organizations to perform better in technology-driven of green AIS with integration between four elements of IT sophistication (technological sophistication, informational sophistication, functional sophistication, and managerial sophistication) to achieve sustainability of Iraqi organizations. The IT sophistication entail all forms of IT usage is able to improve both the performances of individuals and organizations to achieve of sustainable development by the diversity of technologies used by the organization that entails hardware, software, processing mode, and type of operation, informational sophistication represents the nature of applications portfolio and the degree of integration of applications which apparently influences the environmental information content and the quality of green accounting information, the structural aspects including IT or the information system (IS) role, the position of the IT/IS function, and user participation. and the mechanism employed to plan, control and evaluate present and future IT/IS applications which take into account the top management support, evolution of IT, IT investment, as well as organizational objectives. All of these previous processes to achieve of sustainable development in Iraqi organizations .

Therefore, the study extended the literature review for further exploration of the IT sophistication elements in green AIS models. The extended literature review found out the existing gaps related to types of elements. Based on the gaps the research model was built up with possible independent, and moderating structural paths as shown in figure 1.



6. Conclusion:

Previous studies have shown that there is a need to improve AIS practices in Iraqi organizations, by focusing on four elements of IT sophistication (technological sophistication, informational sophistication, functional sophistication, and managerial sophistication) to achieve of sustainable development. In addition to the impact of environmental activities that if they have been neglected and overlooked, they would have a significant impact on the quality of accounting information. In this study, it was highlighted the role of IT sophistication entail all forms of IT usage is able to improve both the performances of individuals and organizations to achieve of sustainable development by the diversity of technologies used by the organization that entails hardware, software, processing mode, and type of operation, informational sophistication represents the nature of applications portfolio and the degree of integration of applications which apparently influences the environmental information content and the quality of green accounting information, the structural aspects including IT or the information system (IS) role, the position of the IT/IS function, and user participation. and the mechanism employed to plan, control and evaluate present and future IT/IS applications which take into account the top management support, evolution of IT, IT investment, as well as organizational objectives. All of these previous processes to achieve of sustainable development in Iraqi organizations .

Thus, the conceptual framework, which has been presented in this study, is mainly to determine the variables that must be taken into consideration when improving the green AIS practices to achieve of sustainable development in Iraqi organizations. Finally, if this proposed framework can be validated, the results will make an important contribution to the literature and help managers and practitioners to make the best decision.

From the aforementioned discussion, in this study can be seen in the following:

- That attention to applied of green accounting "environmental" in the Iraqi organizations are still in the early stages of the existence of several problems, such as the lack of financial and technical data on environmental activities, and the lack of competent of expertise that can work in this field.
- Iraqi organizations recognize that the implementation of sustainable development dimensions (environmental, social, and economic) lead to the preservation of natural resources and the achievement of social and economic justice.
- Iraqi organizations seek to find appropriate solutions to reduce the problem of environmental pollution to contribute to sustainable development. Therefore, this study proposed a model by integration between four elements of IT sophistication (technological sophistication, informational sophistication, functional sophistication, and managerial sophistication) and green AIS practices.
- This study recommended the researchers should carry out many future researches on the quality of green accounting information and the role of IT sophistication on it because it has a significant impact on the perform of organizations to a chive of sustainable development and its environmental, economic and social dimensions.

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