Factors influencing the adoption of big data analytics in accounting: A Study of Energy Companies

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Abstract

Big data is an ascendant technological concept and includes smart energy services, such as intelligent energy management, energy consumption prediction and exploitation of Internet of Things (IoT) solutions. Most companies must therefore be seen as adopting big data analytics (BDA) in accounting system, which is critical for a company to organize, manage and operate its processes. Big data analytics and energy management systems aim to analyses and provide report energy costs, and associated consumption at the organizational level. Therefore, this research intends to study this perspective of factors that influence and affect successful BDA in accounting and related accounting performance in energy companies. For this research, case study and questionnaire methods have been adopted. Case studies have been conducted in two Thai organizations. The findings of the two key case studies indicated 19 variables that could have an impact in accounting in BDA, which contributed to the preliminary framework being developed. Moreover, based on the findings of case studies, a survey instrument was created. Survey questionnaires from 156 respondents were obtained from two large-scale surveys that were sent to the selected members of Thailand accountant, and Thailand computer to test the research framework. The results indicate that the top five critical factors for ensuring BDA in accounting were: 1) information technology strategists; 2) top management commitment, 3) skills development in BDA, 4) technology capability; and 5) competitive environments. All factors were statistically significant at the 0.05 level. Therefore, it is now clear which factors are influencing BDA in accounting system and which of those factors are critical success factors for ensuring DBA in accounting system successes.

Keywords: Energy management systems, Big data Analytics, Accounting Information Systems, Factors influencing big data analytics in accounting

INTRODUCTION

Nowadays, businesses continuously seek to improve the efficiency and effectiveness of their operations for higher profitability and to increase productivity by using Accounting Information System (AIS) [1]. IT has changed the way data is collected, processed, stored, and aggregated for preparation of accounting and finance related information required by the management to control and manage business activities, and as a result accountants were strongly affected by this change [1]. Modern management accountants support and participate in decision-making with management in four areas: strategic cost management to achieve long-term objectives, organizational quality assessment systems and operational control, internal cost activity scheduling, and financial statement preparation [2]. When market rivalry with technological development has risen sharply, accounting has shifted from historical value reporting to more real-time reporting and predictive reporting [3]. While some literature discusses the effect of business analysis on accounting management [4], There is little literature on the use of business analytics to assess the quality of an organization in a business process environment [5]. This paper contributes in a number of ways to the literature. Second, this paper talks about factors influencing big data analytic (BDA) on managerial accounting from an enterprise system perspective. Second, this study proposes the BDA in accounting business accountant system to use data analytics to assess organizational quality. Ultimately, features relevant to a BDA system being introduced. The research is structured according to the following: The next segment examines the rising role of accountants in management and the effects on management accounting of BDA in accounting framework.

Research Questions

The goal of this research is to develop a framework for factors influencing the BDA in accounting related to energy companies. In terms of achieving this objective, the following questions will be investigated:

What factors influencing big data analytics in accounting, and why?

This research will be conducted in energy firms in Thailand, which have, or intend to, adopt and implement BDA in accounting systems.

Research Objective

This research addresses various case studies of different organizations related to big data analytics in accounting in Thailand**.** Outcomes of this research will contribute to substantial knowledge within big data analytics in accounting fields and it also supports other research areas**.** The following emerge as significant objectives**:**

1. To study the relationship between influencing big data analytics and managerial accounting in energy companies**.**
2. To study the critical success factors that could influence big data analytics effectiveness**.**

3. To enhance the existing big data research by providing an in-depth study that represents a new aspect of factors influencing big data analytics in accounting research.

Literature Review

This section discusses the theoretical foundations upon which this research is built.

A. The Changing Roles of Accountants

Information Technology (IT) is already having a significant impact on business, and the accountant's conventional position is changing [1]. According to Wongsim (2017) In general, accounting information technologies produce financial reports on a daily or weekly basis and give useful data for decision-making and organizational performance. Interestingly, organizations have become more attentive to improving their accounting information systems in order to achieve a competitive advantage to compete in the global economy, and manage a rapidly growing business environment. Thus, there is a growing need for research to provide insight into issues and solutions related to management in AIS adoption [1].

B. Big data Analytics in Accounting

Perhaps the key resource in creating the data analytics is the information itself. It is frequently mentioned that IT strategists and data analysts are particularly concerned about the quality of the data they analyse [7]. Although organisations have traditionally evaluated business-specific structured information, the variety and scope of information sources that modern organizations leverage make the quality element very important. Data quality is a valuable resource that may be measured by its completeness, precision, format, timeliness, reliability, and perceived value [8]. It has been argued that data resources with the above-mentioned attributes are vital for an organization to sustain its benefit in a very data-oriented economy [9]. The importance of data accessibility and integration from many sources that are typically segregated due to present IT systems [10].

Big data and business analytics are now influencing practically every area of decision-making, strategic analysis, and forecasting at major corporations [11]. To maintain a competitive advantage, a company may develop, purchase, extract, gather, process, and analyze millions of data elements from external and/or internal sources on any given day. Big data and business analytics are no longer the exclusive realm of a few early adopters and innovators; they are now required reading for any company that wants to stay competitive [12, 21]. Because management accountants have typically used accounting data to assist business managers, the availability and usage of big data and analytics by businesses is likely to have an impact on the management accounting specialist. However, in order to grasp big data and business analytics in the internal business environment and context, it is required to first understand big data and business analytics. Big data can be defined as data sets that are so large or unstructured that they are inaccessible to most database management systems and software programs [12]. Big data can come from a variety of sources, including emails, audio files, site click streams, social media, news media, sensor photos, videos, and RFID tags, as well as traditional payment systems. Four

characteristics or the four V's have defined big data: enormous volume, high speed, wide variety, and uncertain veracity [10]. Historically, transactions and other structured data such as orders, sales, purchase orders, shipments, receivables, personal information, time sheets and inventory have been recorded by company and accounting data. These are predictable, orderly, and business-friendly data. Unlike big data, this sort of information stands. Where the former information has been divided into rows and columns, the latter information is not organized and may seem overwhelming due to the quantity, variety and type of information. Big data advent has altered the job of the accountant leadership. A company that uses big data would have spent substantial resources in collecting, processing, preparing, and eventually analyzing it, thus expecting greater ideas and understanding as outcomes. In addition to being large or not, it is essential for any sort of information that it is of high quality [19]. High quality data is complete, valid, accurate, relevant, consistent, and timely [1]. Research demonstrates that high-quality information is a significant resource and asset for company [19] and has tremendous impact on an entity's performance [10, 11].

C. Factors influencing of big data analytics in accounting

Big data can support entities in appraising their data assets by expanding vigorous assessment techniques. Accountants and finance experts must first assess which data is useful, then select a proven valuation method and identify critical assumptions. Data value will also be enhanced through stewardship and control. The notion is that accountants and other experts can help turn internal data sets into something more valuable, secure, robust, and in demand. Using big data to make decisions will result in more precise real-time support. The nature of services that accounting professionals provide, as well as their liaison with the decision makers of the corporate world will totally vary due to the advancement of self-service data recovery. Furthermore, accountants' responsibilities will not be restricted to reporting financial data. They will be able to determine the choices that decision makers can use by examining diverse data sets [13]. However, there are certain challenges. As more and more new information becomes available, big data can swiftly devalue. Furthermore, the value of data varies depending on how it is used [14].

Recent data analytics development has also seen auditors, accountants, and finance professionals collaborate closely with the information technology and information management departments in cross-functional and multidisciplinary teams. The auditors may even need to improve their skills and do things differently, such as inventing new measurements, learning new analytical skills, and developing a data visual language [15]. Data analytics is vital for everything from social media comments and online product evaluations to information on quality standards, labor conditions, and political dangers in the abroad environment. Unstructured data and data that isn't typically available from the information system will become more important to collect and synthesize [16].

As the fresh methods take place, significant and basic changes are taking place in the tax audit profession and practice. These modifications include organizational cooperation to correct previous shortcomings and create ability for future action while integrating fresh technology apps to boost risk

effectiveness, best practices, quality service and tax performance. Together, fresh methods create an infrastructure for information technology that promotes innovation by enabling cooperation, fast analysis and experimentation [16]. The impetus for change, however, is internal and external to the sector, such as science understanding, especially about causal relationships, and technical skills are extending our understanding of hazards and how to cope with them [17], [20]. The literature on tax incentives for organizational cooperation usually focuses on how actors work around the institutional framework to resolve conflicts of interest and, where possible, impact it [18, 19].

D. Big data analytics and energy management systems

Big data is an ascendant technological concepts and includes smart energy services, such as intelligent energy management, energy consumption prediction and exploitation of Internet of Things (IoT) solutions. As a result, big data technologies will have a significant impact in the energy sector. At the organizational level, Energy Accounting Systems (EAS) platforms measure, analyze, and report energy expenses and associated consumption. The flow of information can be improved by improving enterprises' knowledge transfer procedures and innovation networks [22]. Firms can find and exploit eco-innovation opportunities with better knowledge and information [22]. This is due to the fact that information and knowledge are critical resources and capabilities that can support game-changing breakthroughs [23, 24]. Firms can generate information and knowledge that can be used to churn out eco-innovations using big data analytics, thanks to the increasing parameters and amount of data at their disposal [23]. Eco-innovation should be interwoven in the actions of organizations, as sustainable development has become the benchmark for addressing pressing global environmental concerns [24].

Big data analytics also allows for real-time market information. As a result, this information can stimulate organizations' ability to adopt servitization through creative product and service combinations [27]. As companies engage in eco-innovation, their business models are becoming more servitized [25, 26], embracing big data analytics necessitates the use of data by the firm's numerous departments and divisions in order to sustainably boost production [28]. Reduced manufacturing costs and risks are also potential benefits of eco-innovative enterprises adopting servitization in conjunction with big data analytics [29, 30]. Furthermore, real-time optimization of manufacturing processes is possible, leading in improved firm and production fit as well as higher operating efficiency.

Theoretical Framework

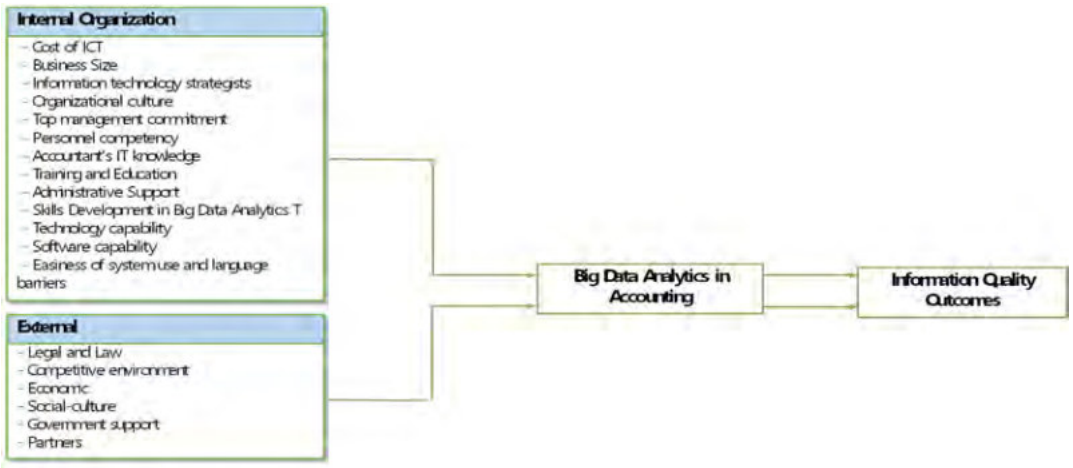

Figure 1. Theoretical framework

Here, organization factor considers an organization's performance in terms of information quality outcomes, and external organization factors exist outside the organization in its external environment, for example competitive environment, economic, social-culture and government support. Fig1 presents our theoretical model, which summarizers the structure relationship between influences factors and BDA adoption quality of energy companies.

RESEARCH METHODOLOGIES

This research was conducted in Thai listed energy firms, which have adopted and implemented BDA in accounting systems. In this study used quantitative and qualitative research approach. In order to achieve the research objectives this research comprised three phases. Phas1) Detailed and focused literature review; Phase2) Data collection through multiple case studies – confirmatory stage; and Phase3) Data Analysis.

RESEARCH FINDINGS

In Section B of the questionnaire, survey respondents were asked to pick from the list of 19 factors in Section A the top three most critical factors in BDA accounting adoption systems. A number of respondents in this section indicated that all 19 factors listed in the questionnaire are significant; it was difficult for them to choose which considerations were the most important in AIS adoption, which further sanctioned the validity of the questionnaire design.

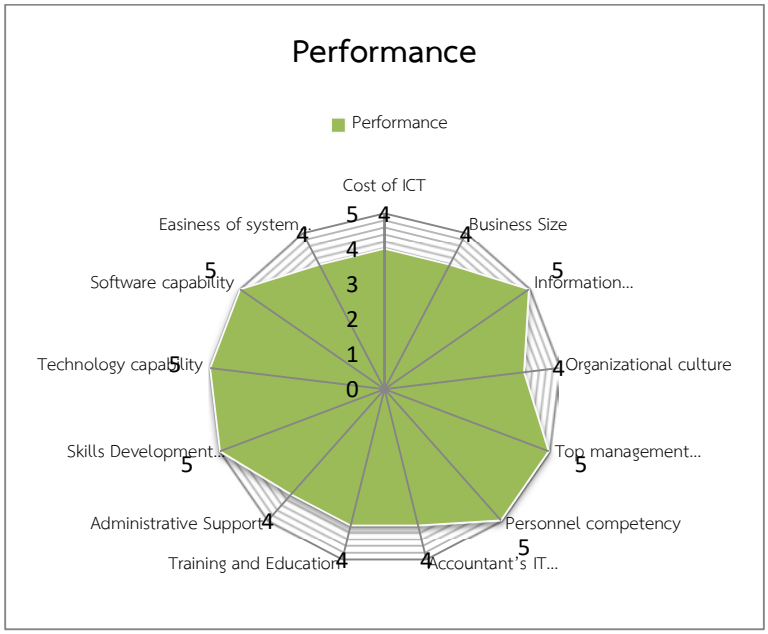

Figure 2. Internal Organization factors. *Source: Developed for this research*

A. Internal Organization factors

Respondents were asked to indicate on a scale of five options that consisted of unimportant agreement, unimportant agreement, significant agreement on average, very important agreement, and great agreement. Thai listed companies have an average of 5 *(*extremely agreed*)* scores for any factor was information technology strategists, top management commitment, skills development in big data analytics, technology capability, software capability; an average score of 4 *(*very important agree*)* was achieved for accountants including cost of ICT, accountant's IT knowledge, training and education, administrative support, easiness of system use and language barriers. In additionally, firms with an average score of 3 *(*average important agree*)* addressed factors including business size, organizational culture. A score of less than 2.00 for any factor was not revealed by the results.

B. External Factors

Thai listed organizational firms have the most critical factor in average scores of 5 *(*extremely agreed*)* external factors required by competitive environment; an average score of 4 *(*very important agree*)* was achieved for external factors including legal and law, economic, social-culture, government support. Moreover, firms with an average score of 3 *(*average important agree*)* addressed factors were partners. A score of less than 2.00 for any factor was not revealed by the results.

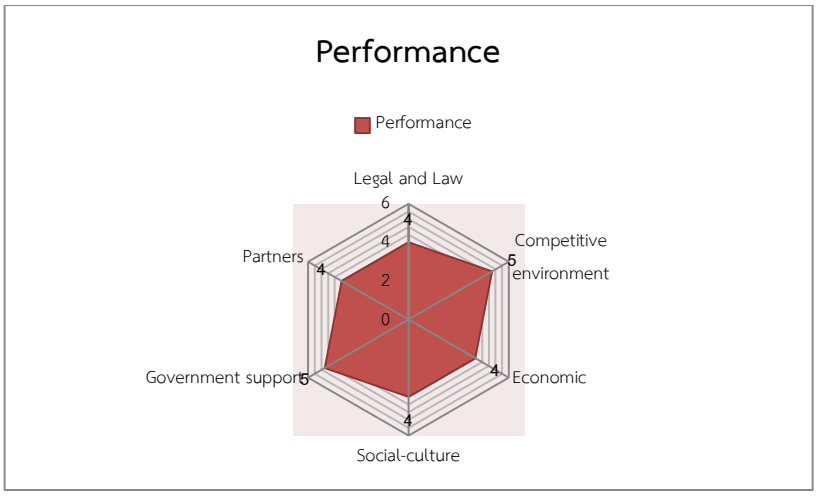

Figure 3. External factors *Source: Developed for this research*

DISCUSSION AND CONCLUSIONS

With respect to building an increasing BDA in accounting system adoption, this study attempts to investigate whether significant factors that could affect the quality of accounting for BDA are relevant. This research was carried out on 156 respondents ' data within energy firms in Thailand; data was collected by in-depth interviews that involved semi-structured interviews and unstructured interviews. The 19 factors identified from the case studies were categorized into two groups: organization factors, and external organization factors. This work offers detailed insights into critical success factors, which could have the most positive effect on knowledge of high-quality outputs. Management of an organization should be aware of the most important factors in DBA in accounting adoption. Moreover, most critical factors for DBA in accounting adoption this work has detailed those managers can use as a guide to concentrate their attention and allocation of resources. As DBA in accounting is essential to doing business now and in the further, research analyzing the methodology will make a significant contribution to understanding how companies achieve BDA in accounting performance and use this guide to increase the quality of accounting information systems. This evidence suggests the adequate understand influences factors management must be discussed in relation to the existing accounting processes in organizations.

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