Big Accounting Data and Sustainable Business Growth: Evidence from Listed Firms in Thailand

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Abstract

This study aims at investigating the effects of big accounting data on the sustainable business growth of listed firms in Thailand. In addition, it examines the mediating effects of accounting information quality and decision-making effectiveness and the moderating effects of digital innovation on the research relationships. The study's useful samples are the 289 listed Thai companies. To examine the research relationships, the structural equation model and multiple regression analysis are used in this study. According to the results of this study, big accounting data has a significant effect on accounting information quality, decision-making effectiveness, and sustainable business growth. Next, accounting information quality significantly affects decision-making effectiveness and sustainable business growth. Similarly, decision-making effectiveness significantly affects sustainable business growth. Both accounting information quality and decision-making effectiveness mediate the big accounting data-sustainable business growth relationships. Lastly, digital innovation moderates the effects of accounting information quality and decision-making effectiveness on sustainable business growth. Accordingly, In conclusion, big accounting data has emerged as a key source of sustainable competitive advantage. As a result, to succeed in competitive environments, businesses must have a thorough understanding of big accounting data.

1. Introduction

Recently, digital technology has grown continuously and beneficially. It has been instrumental in transforming businesses and society globally (Hutajulu et al., 2021). IoT, data analytics, big data, blockchain, artificial intelligence, and cloud computing are all valuable digital technology instruments. Digital technology has enabled important business improvements and generated innovation prospects for improving customer experience, optimizing business

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operations, and generating new business models as a result of business enterprises' digitalization (Bui, 2021; Khin & Ho, 2019). Product and service operations have been better managed, and new value propositions have been produced. They effectively communicate and share smart products, services, and solutions with a wide range of customers, both current and potential. As a result, businesses that use digital technology can better service their consumers, deal with competitive settings, obtain a competitive edge, and develop their businesses. As a result, digital technology has evolved into a useful corporate tool for surviving and thriving in today's highly competitive conditions.

In light of the rapid advancement of digital technology, big data, as one of the digital technology's instruments, has emerged as a viable business strategy and technique. It can help you make better operational decisions, build strategic positions, improve competitive advantages, and achieve better results. Big data is defined as a set of data and technology that accesses, integrates, and reports all available data by filtering, correlating, and reporting insights that previous data technologies couldn't provide (Ren et al., 2017).

It comprises high-volume, high-velocity, and/or high-variety information assets that necessitate new types of electronic processing to improve decision making, insight finding, and process optimization. The big accounting implementation facilitates an organization's ability to transform data into knowledge creation and management, as well as offering actions. Big data, interestingly, can cause and influence significant managerial changes and practices by providing more flexibility and productivity, as well as a greater ability to meet consumer wants, outperform competitors, and compete in target markets (Vitale et al., 2020). Accordingly, firms can utilize big data for creating business value with high operational and strategic potentials in transforming to competitive advantage and best performance.

Big data has continued to make significant changes to accounting. This study focuses only on big data in the accounting aspect. It is called "big accounting data". In this study, big accounting data refers to the ability of firms to create information systems and activities which accumulate, retrieve, and examine dynamic, large, and disparate volumes of accounting data through digital goods and technologies (Green et al., 2018). In addition, big accounting data is defined as a collection, collation, and analysis of enormous data quantities made available on social networks with the aim of improving business performance via an accounting function (Arnaboldi et al., 2017). It comprises of huge volume, rapid velocity, great variety, trustful veracity, and added value (Rezaee & Wang, 2019). It can provide cost-effective and innovative forms of information processing for enhanced insight and decision making, create competitive advantages, and satisfied with business outcomes. With both opportunities and challenges of big accounting data, firms can provide accounting information quality for promoting decision making to gain business competitiveness, achieve superior performance and support their growth.

Interestingly, accounting information quality refers to the attribute, intrinsic nature, context, form, and accessibility of accounting information, consisting of relevance, understandability, accuracy, usability, and timeliness (Drum et al., 2017). It represents accountability, transparency, and decision-usefulness of the accounting information. It serves as a basis for making the most appropriate and suitable business and financial decisions at all times. Similarly, accounting information quality represents the extent to which accounting information can help estimate a firm's future performance and calculate the firm value (Perdana et al., 2019). It leads to competitive advantage, better financial performance, and sustainable business growth. Next, decision-making effectiveness is defined as the extent to which a decision achieves the objectives and goals established by management at a proper time within the considered constraints (Cao et al., 2019). It is an ability of firms to exactly understand and identify the appropriate actions and reactions for creating strategic choices, succeeding in the competitive markets, and sustaining business growth in these environments. It occurs from the best available alternative and contributes to the most effective of an organization. To prove the big accounting data-sustainable business growth relationships, both accounting information quality and decision-making effectiveness are proposed to mediate the relationships. Lastly, sustainable business growth is a vital aspect to assess business success that relates to the value creation process of firms and longer survival endeavors (Islam & Wahab, 2021). It represents obtaining financial goals and performance over time periods within firms' abilities and capabilities through affirming future accomplishments without jeopardizing their long-term existence.

To strengthen the research relationships, digital innovation is defined as the creation of market offerings, business processes, or models that result from the use of digital technology (Huesig & Endres, 2019). It combines digital and physical components for creating new processes, solutions, and business models and producing products, platforms, and services. It is key to deriving value from the growing opportunities of digitalization, developing the organizational capacity to recognize firms' business benefits, and enabling them to gain a competitive advantage in the changing markets. Accordingly, firms with digital innovation can create new customer experiences and other value pathways and better serve markets effectively to again sustain competitive advantage and achieve superior business performance. Thus, digital innovation is proposed as a moderator of the research relationships.

In this study, testing the effects of big accounting data on the sustainable business growth of listed firms in Thailand is the main goal of the study. This study investigates both accounting information quality and decision-making effectiveness as the mediators of the study while it examines digital innovation as the moderator of the study. Listed firms in Thailand are both large-sized enterprises and considerable public businesses that have a great impact on Thailand's economies, societies, and environments. To achieve business goals and objectives, these firms need to have and utilize various information types to provide best business practices, operations, functions, and strategies for gaining competitive advantages and surviving and sustaining in the competitive markets. Accordingly, big accounting data becomes a potential strategic tool for helping them achieve their goals and objectives. Thus, listed firms in Thailand are considered suitable samples of the study. Interestingly, the key research question is how big accounting data affects sustainable business growth. The specific research questions are: (1) How big accounting data affects both accounting information quality and decision making effectiveness, (2) How both of them affect sustainable business growth, (3) How they mediate the big

accounting data-sustainable business growth relationships, and (4) How digital innovation moderates the relationships among big accounting data, accounting information quality, decision making effectiveness, and sustainable business growth.

2. Literature Review

The information richness hypothesis is used to verify the relationships between big accounting data and long-term business growth in this study. According to the existing research on information richness theory, increased insight and rapid comprehension of competitive markets and environments can be facilitated by having more information (Daft & Lengel, 1986). It can be improved to get a competitive advantage in these markets and environments. Accordingly, big accounting data as a message type of information richness provides information delivered through a combination of structured, semi-structured, and unstructured data collected by organizations that can be mined for information and used in machine learning projects, predictive modeling, and other advanced analytics applications and it leads to better decisions and strategic business moves. As a result, large accounting data is linked to long-term corporate growth. Big accounting data is an independent variable in this study, while accounting information quality and decision-making effectiveness are mediating variables, digital innovation is a moderating variable, and long-term business growth is the dependent variable. The conceptual model of big accounting data-sustained business growth relationships is shown in Figure 1.

2.1. Sustainable Business Growth

In general, sustaining business growth is a critical goal for companies operating in competitive situations. Here, sustainable business growth is described as an important factor to consider when evaluating a company's success, as it pertains to the value generation process and the company's long-term existence (Islam & Wahab, 2021). It denotes achieving long-term financial goals and organizational performance throughout time periods that are within the capacity of the corporation. It validates future achievements without endangering their long-term viability. In general, sustaining business growth is a critical goal for companies operating in competitive situations. Here, sustainable business growth is described as an important factor to consider when evaluating a company's success, as it pertains to the value generation process and the company's long-term existence (Islam & Wahab, 2021). It denotes achieving long-term financial goals and organizational performance throughout time periods that are within the capacity of the corporation. It validates future achievements without endangering their long-term viability. Accordingly, firms with big accounting data can achieve sustainable business growth in competitive environments. Thus, sustainable business growth is proposed to become a result of implementing big accounting data in an organization.

2.2. Big Accounting Data

Interestingly, big accounting data plays a significant role in driving firms' sustainable business growth. It is a potential
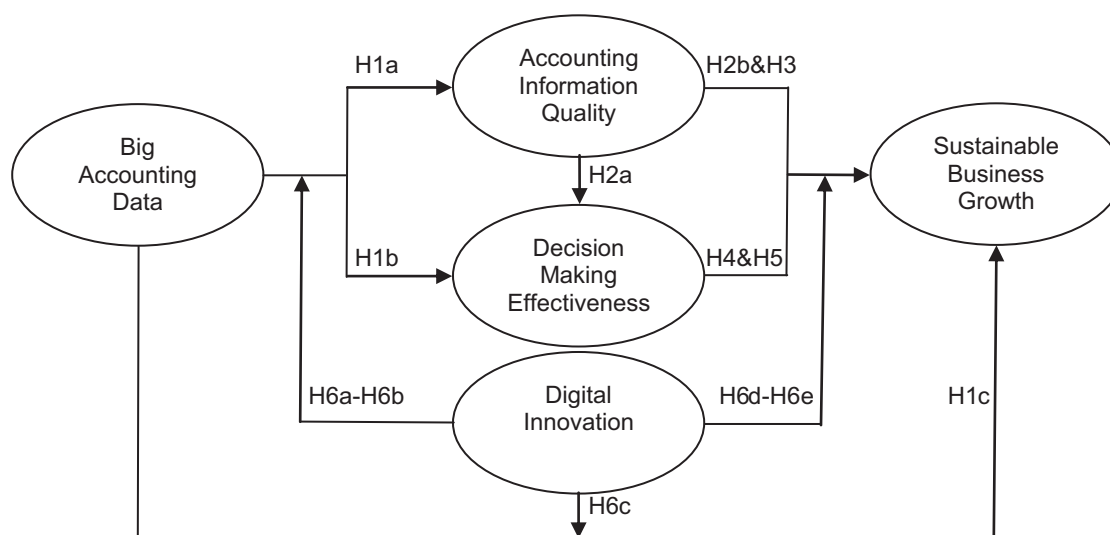

Figure 1: A Conceptual Model of the Big Accounting Data-Sustainable Business Growth Relationships

determinant of their long-term successful operations. Here, big accounting data is defined as the ability of firms to create information systems and activities which accumulate, retrieve, and examine dynamic, large, and disparate volumes of accounting data through digital goods and technologies (Green et al., 2018). It refers to a collection, collation, and analysis of enormous data quantities made available on social networks with the aim of improving business performance via an accounting function (Arnaboldi et al., 2017). In this study, big accounting data comprises huge volume, rapid velocity, great variety, trustful veracity, and added value (Rezaee & Wang, 2019 Huge volume refers to the amount of data; rapid velocity refers to the increased rate of data generation and potential processing; great variety refers to the desired diversity in the types of data; trustworthy veracity refers to the data's accuracy and reliability, and added value refers to the benefit of data over its cost. It satisfies a need for atomized, reconfigurable, and transparent accounting data and information that is tailored to the needs and desires of businesses. Internal financial actions, the aggregation of transactional records and changes made both internally and externally, and direct decision-making upgrades are the outcomes.

In addition, big accounting data is a driver of innovation, productivity growth, and new modes of competition, value captures, and new opportunities (Torre et al., 2018). Accordingly, big accounting data can enhance qualified accounting information quality, support effective and efficient decision making and sustain levels of business growth. It can deliver cost-effective and innovative data processing for better insight and decision-making, as well as long-term competitive benefits and satisfying business outcomes. Firms can supply accounting information quality for promoting decision-making to acquire business competitiveness, accomplish superior performance, and support their growth by utilizing both the potential and constraints of big accounting data. As a result, the best large accounting data is linked to the quality of accounting data, decision-making efficacy, and long-term business success. Therefore,

H1: Big accounting data positively affects (a) accounting information quality, (b) decision-making effectiveness, and (c) sustainable business growth.

2.3. Accounting Information Quality

Accounting information quality is defined as the fitness of the accounting data and information in both content and format to support the task being undertaken (Perdana et al., 2019). It represents the extent to which accounting information can help estimate a firm's future performance and calculate firm value. Firms with accounting information

quality can minimize asymmetric information and signal and provide useful accounting information to the effectiveness and efficiency of their decisions. Similarly, accounting information quality refers to the attribute, intrinsic nature, context, form, and accessibility of accounting information (Drum et al., 2017). It presents the qualitative characteristics included in the conceptual framework that make accounting information useful for financial reporting. It comprises relevance, understandability, accuracy, usability, and timeliness. First, relevance refers to how well data and information are suitable and useful for the work at hand. Second, understandability refers to how well data and information are clear, without ambiguity, and easy to comprehend. Third, precision refers to the degree to which facts and information are correct, dependable, and error-free. Fourth, usability relates to how beneficial and advantageous data and information are to utilize.

Lastly, timeliness refers to the extent to which the age of the data is appropriate for the task at hand. In addition, accounting information quality represents accountability, transparency, and decision-usefulness of the accounting information (Cohen & Karatzimas, 2017). It serves as a basis for making the most appropriate and suitable business and financial decisions at all times. It leads to competitive advantage, better financial performance, and sustainable business growth. Accordingly, firms with accounting information quality can gain decision-making effectiveness and achieve sustainable business growth in competitive environments. As mentioned earlier, accounting information quality is a go-between for big accounting data and sustainable business growth and it is a potential mechanism by which big accounting data can produce changes in sustainable business growth. Thus, accounting information quality is hypothesized to mediate the research relationships. Therefore,

H2: Accounting information quality positively affects (a) decision-making effectiveness and (b) sustainable business growth.

H3: Accounting information quality mediates the big accounting data-sustainable business growth relationships.

2.4. Decision-Making Effectiveness

Critically, decision-making effectiveness is defined as the extent to which a decision achieves the objectives and goals established by management at a proper time within the considered constraints (Cao et al., 2019). It is the expected proportion of correct choices and the judgment conformity of normative benchmarks under the existing conditions. The characteristics of decision-making effectiveness present the best available alternative and the most effective of the organization. Firms with decision-making effectiveness can

be more effective at understanding customers, making real-time decisions, and responding more quickly to change. They can sustain profit growth, fulfill management satisfaction and meet the expected results. Accordingly, decision-making effectiveness can influence organizational outcomes and sustain business growth through strategic choices. Interestingly, decision-making effectiveness refers to the ability of firms to exactly understand and identify the appropriate actions and reactions for matching internal resources with the competitive environments, creating strategic choices, succeeding in the competitive markets, and sustaining business growth in these environments (Kaufmann et al., 2012). Firms with decision-making effectiveness can promote dynamic competitive advantage, enhance superior organizational performance and encourage sustained business growth. Similarly, decision-making effectiveness causes mediation in big accounting data and sustainable business growth. It explains the linkages between the aforementioned two variables. Thus, decision-making effectiveness is proposed to become a significant influencer of sustainable business growth and mediate the research relationships. Therefore,

H4: Decision-making effectiveness positively affects sustainable business growth.

H5: Decision-making effectiveness mediates the big accounting data-sustainable business growth relationships.

2.5. Digital Innovation

Digital innovation is defined as the creation of market offerings, business processes, or models that result from the use of digital technology (Huesig & Endres, 2019). It is the development and implementation of new products, services, and solutions by using digital technology as a means or end within and across organizations (Khin & Ho, 2019). It combines digital and physical components for creating new processes, solutions, and business models and producing novel products, platforms, and services. It leads to changing entrepreneurial culture, novel value creation, and competitive advantages for firms. Firms with great digital innovation can change their products, services, and business models and create new customer experiences and other value pathways through the use of digital technology. In addition, digital innovation refers to a process of generating, accepting, and implementing new ideas in products, services, and models through the increasing pace of advanced digital technologies with modes of operating businesses (Ciriello et al., 2018). It enables firms to gain a competitive advantage in competitive environments. Accordingly, concerning both innovative digital solutions and complementary digital business concepts, digital innovation is key to deriving value from the growing opportunities of digitalization,

developing the organizational capacity to recognize firms' business benefits, and enabling them to gain competitive advantages in the changing markets. Interestingly, digital innovation can moderate the relationships among big accounting data, accounting information quality, decision-making effectiveness, and sustainable business growth. In the existing literature, a moderator can affect the strength and direction of the research relationships. Thus, digital innovation is proposed to moderate the aforementioned relationships. Therefore,

H6: Digital innovation moderates (a) the big accounting data-accounting information quality relationships, (b) the big accounting data-decision making effectiveness relationships, (c) the big accounting data-sustainable business growth relationships, (d) the accounting information quality-sustainable business growth relationships, and (e) the decision making effectiveness-sustainable business growth relationships.

3. Data and Methodology

3.1. Data Collection and Sample Selection Procedure

In this study, 768 listed Thai companies were issued questionnaires by mail survey. These companies are large-scale businesses as well as significant public entities that have a significant impact on Thailand's economies, society, and surroundings. Big accounting data can help businesses acquire competitive advantages and compete, survive, and thrive in competitive marketplaces by providing the best business practices, operations, functions, and strategies. As a result, listed Thai companies are regarded appropriate study samples. The key informants were accounting executives, namely chief financial officer, accounting director, accounting, or other accounting executives. With regards to the questionnaire mailing, 293 responses were received. Of the surveys completed and returned, 289 were usable. The effective response rate was approximately 37.63%. With an appropriate follow-up procedure, the response rate for a mail survey as being greater than 20 is considered acceptable (Aaker et al., 2001). For verifying potential non-response bias, a comparison of the first and the second wave data as recommended by Armstrong and Overton (1977) was considered. In this regard, neither procedure showed significant differences because there were no statistically significant differences between the first and the second groups at a 95% confidence level as a firm size ($t = 0.29$, $p > 0.05$), firm age ($t = 0.24$, $p > 0.05$) and firm capital ($t = 0.26$, $p > 0.05$). Thus, this study has no response bias problems for testing the research relationships.

3.2. Measures

All constructs were measured using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), except for control variables as firm age, firm size, and firm capital (Setiawan et al., 2021). All variables consist of big accounting data, accounting information quality, decision-making effectiveness, digital innovation, and sustainable business growth. Thus, sources of all variable measurements are presented in Table 1. Appendix A presents a measurement of all variables in this study. For verifying the research results, control variables were examined because they are elements that are constant and unchanged throughout the investigation. Here, the control variables comprise firm age (FA) (the number of years a firm has been in existence using a dummy variable as less than 10 years = 0 and equal to or greater than 10 years = 1), firm size (FS) (the number of employees in a firm using a dummy variable as less than 250 employees = 0 and equal to or greater than 250 employees = 1) and firm capital (FC) (the amount of money a firm has invested in doing business using a dummy variable as less than 500 million baht = 0 and equal to or greater than 500 million baht = 1).

3.3. Instrument Tests

Confirmatory factor analysis, discriminant power, and Cronbach alpha coefficients are used in this study to demonstrate the research instrument's quality. To begin, confirmatory factor analysis examines the underlying relationships of a large number of items to see if they can be condensed into a smaller number of factors. As a result, all factor loadings with values of 0.71–0.96 are statistically significant and above the 0.40 cut-off (Nunnally & Bernstein, 1994). Second, discriminant power was used to assess the measurement's validity using item-total correlation. Item-total correlations of 0.65–0.95 are greater than 0.30 in the scale validity (Churchill, 1979). Finally, Cronbach alpha coefficients are used to assess the measurement's consistency. Cronbach alpha coefficients of 0.87-0.94 are larger than 0.70 in scale dependability (Nunnally & Bernstein, 1994). As a result, all qualifying scales of measurement are accepted. Table 2 presents the validity and reliability results for multiple-item scales used in this study.

Interestingly, both structural equation model and multiple regression analysis are applied to test the research relationships. For investigating the direct and indirect effects

Table 1: Sources of All Variable Measurements

Variables	Definition	Items	References
Big accounting data (BAD)	The ability of firms to create information systems and activities which accumulate, retrieve, and examine dynamic, large, and disparate volumes of accounting data through digital goods and technologies	9	Green et al. (2018); Rezaee and Wang (2019)
Accounting information quality (AIQ)	The fitness of the accounting data and information in both content and format to support the task being undertaken	15	Drum et al. (2017); Perdana et al. (2019)
Decision making effectiveness (DME)	The extent to which a decision achieves the objectives, goals, targets, and aims established by management at a proper time within the considered constraints	7	Cao et al. (2019); Kaufmann et al. (2012)
Digital innovation (DIN)	The creation of market offerings, business processes, or models that result from the use of digital technology	7	Huesig and Endres (2019); Khin and Ho (2019)
Sustainable Business Growth (SBG)	A vital aspect to assess business success that relates to the value creation process of firms and longer survival endeavor	6	Islam and Wahab (2021); Schwab et al. (2017)

Table 2: Results of Measure Validation

Items	Factor Loadings	Item-Total Correlation	Cronbach Alpha
Big accounting data (BAD)	0.76–0.87	0.67–0.90	0.93
Accounting information quality (AIQ)	0.78–0.94	0.71–0.84	0.91
Decision making effectiveness (DME)	0.77–0.93	0.78–0.92	0.87
Digital innovation (DIN)	0.81–0.93	0.65–0.92	0.94
Sustainable business growth (SBG)	0.71–0.96	0.68–0.95	0.89

of big accounting data on sustainable business growth, a structural equation model is employed. In addition, multiple regression analysis is implemented to examine the moderating effects of the research relationships. The results of this study are presented in the next section.

4. Empirical Results and Discussion

Table 3 presents the descriptive statistics and correlation matrix for all variables. Multicollinearity might occur when inter-correlation in each predicted variable is more than 0.80, which is a high relationship (Hair et al., 2010). The correlations range from 0.50 to 0.76 at the $p < 0.05$ level, which means that the possible relationships of the variables in the conceptual model could be tested. Thus, there are no substantial multi-collinearity problems encountered in this study.

Table 4 presents the results of path coefficients and hypotheses testing of the direct and indirect research relationships. Figure 2 shows a summary of the effects of big accounting data on sustainable business growth through the mediators of accounting information quality and decision-making effectiveness. In this study, a measure of goodness of fit for statistical models is verified (Herda & Lavelle, 2012). The comparative fit index (CFI), the goodness of fit index (GFI), the incremental fit index (IFI), and root mean square error of approximation (RMSEA) are employed. First, the CFI value always lies between 0 and 1, with the value of 0.91 over 0.90 indicating a relatively good fit (Bentler, 1990). Second, the GFI value is an index that ranges from 0 to 1, with a value of 0.94 over 0.90 indicating a relatively good fit (Byrne, 1998). Thirdly, the IFI value of 0.92 exceeding 0.90 indicates a relatively good fit (Kline, 1998). Last, the RMSEA value of 0.04 or less than 0.05 indicates a close fit and less than 0.08 suggests a marginal fit (Bollen & Long, 1993). Accordingly, the initial test of the measurement model results in a good fit for the data.

Table 3: Descriptive Statistics and Correlation Matrix

Variables	BAD	AIQ	DME	DIN	SBG
Mean	4.32	4.24	4.15	4.45	4.26
s.d.	0.44	0.58	0.52	0.43	0.51
BAD					
AIQ	0.57**				
DME	0.50**	0.71***			
DIN	0.65***	0.75***	0.58**		
SBG	0.53**	0.76***	0.71***	0.65***	

**p* < 0.05, ****p* < 0.01.

Table 4: Results of Path Coefficients and Hypotheses Testing

Hypotheses	Relationships	Coefficients	*t*-value	Results
H1a	BAD → AIQ	0.49*	2.20	Supported
H1b	BAD → DME	0.51**	2.77	Supported
H1c	BAD → SBG	0.47*	2.12	Supported
H2a	AIQ → DME	0.86***	9.82	Supported
H2b	AIQ → SBG	0.94***	10.52	Supported
H3	BAD → AIQ	0.49*	2.20	Supported
	AIQ → SBG	0.94***	10.52	
H4	DME → SBG	0.96***	10.99	Supported
H5	BAD → DME	0.51**	2.77	Supported
	DME → SBG	0.96***	10.99	

**p* < 0.10, ***p* < 0.05, ****p* < 0.01, CFI = 0.91; GFI = 0.94; IFI = 0.92; RMSEA = 0.04.
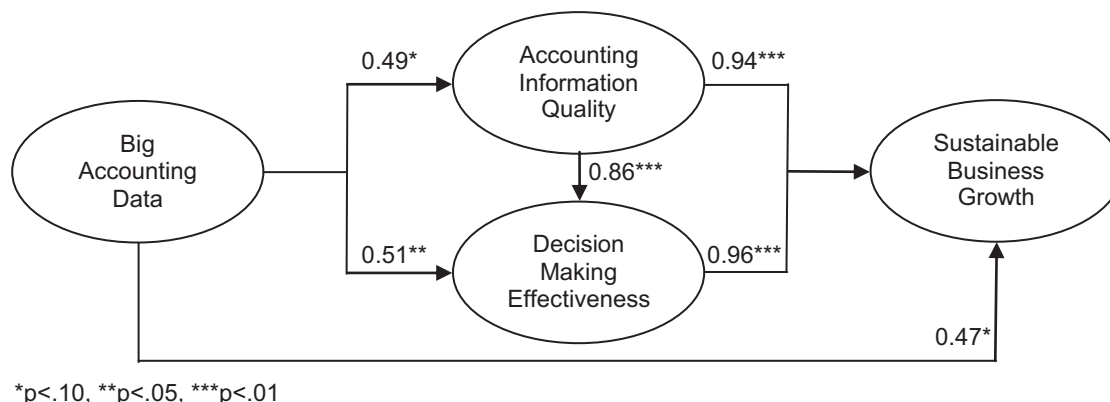
*p<.10, **p<.05, ***p<.01

Figure 2: A Summary of the Big Accounting Data-Sustainable Business Growth Relationships

Big accounting data is important in determining accounting information quality, decision-making efficacy, and long-term corporate success in this study. It has a significant impact on the quality of accounting information ($b = 0.49$, $p < 0.06$), decision making effectiveness ($b = 0.51$, $p < 0.02$) and sustainable business growth ($b = 0.47$, $p < 0.06$). Firms have used digital goods and technology to implement big accounting data by establishing information systems and activities that collect, retrieve, and analyze dynamic, vast, and heterogeneous volumes of accounting data (Green et al., 2018). They may gather, compare, and synthesize vast quantities and volumes of accounting data made available on social networks to better match their needs and goals and improve business performance. Similarly, businesses that utilize big accounting data can aggregate transactional accounting records and changes to improve their decision-making. They have the potential to foster organizational innovation, productivity growth, new competitive modes, value captures, and new opportunities (Torre et al., 2018). Thus, they can provide accounting information quality, promote decision-making effectiveness and gain sustainable business growth. Accordingly, big accounting data is explicitly related to all mentioned outcomes earlier. *Therefore, Hypotheses 1a-1c are supported.*

Next, accounting information quality refers to the ability of accounting data and information to support the task at hand in terms of intrinsic nature, context, form, and accessibility (Perdana et al., 2019). It positively affects decision making effectiveness ($b = 0.86$, $p < 0.01$) and sustainable business growth ($b = 0.94$, $p < 0.01$). Accounting information quality, according to the existing literature, can assist firms in minimizing asymmetric information and while also providing useful accounting information for estimating future performance and calculating firm value based on the effectiveness and efficiency of their decisions. It has the potential to improve competitive advantage, financial performance, and long-term corporate growth.

Accounting information quality allows businesses to make strategic decisions and actions that are both suitable and valuable in competitive environments. They can gain outstanding operational competitiveness, achieve superior organizational performance and sustain dynamic business growth under the competition of holding accounting information richness. Accordingly, accounting information quality is positively related to decision-making effectiveness and sustainable business growth. *Therefore, Hypotheses 2a–2b are supported.* In addition, accounting information quality can link big accounting data and sustainable business growth and it is a go-between for these concepts. Baron and Kenny (1986) stated that accounting information quality potentially mediates the big accounting data-sustainable business growth relationships. It is a mediator of the research relationships. *Therefore, Hypothesis 3 is supported.*

Lastly, decision-making effectiveness is an important determinant of sustainable business growth. It has a significant effect on sustainable business growth (b = 0.96, $p < 0.01$). In this study, firms' effective decisions can achieve the objectives and goals established by management at a proper time within the considered constraints (Cao et al., 2019). They can achieve the required proportion of accurate choices by stressing the best accessible alternative and the organization's most effective, as well as the judgment conformance of normative benchmarks within the current circumstances. They have a better understanding of customers, can make real-time judgments, and respond to change more swiftly. Firms that are effective at making decisions may also understand and identify the necessary actions and reactions for matching internal resources to competitive environments, making strategic decisions, and achieving and maintaining corporate growth in changing circumstances (Kaufmann et al., 2012). Accordingly, decision-making effective-ness is positively related to sustainable business growth. *Therefore, Hypothesis 4 is supported.* To verify the mediating effects of the research relationships, decision-

making effectiveness links big accounting data and sustainable business growth whose existence helps explain the relationship between these two variables. It can link big accounting data to sustainable business growth and it can become a mediator of the study. Thus, decision-making effectiveness explicitly mediates the research relationships. *Therefore, Hypothesis 5 is supported.*

Table 5 presents the results of multiple regression analysis and hypotheses testing of the moderating research relationships. Digital innovation, in this context, refers to the conception, development, and implementation of market offers, business processes, or models as a result of the application of digital technology (Huesig & Endres, 2019). Firms with digital innovation can change entrepreneurial culture, create novel value creation and gain competitive advantages through generating, accepting, and implementing new ideas in products, services, and models of operating businesses. As a result, digital innovation

is crucial for deriving value from digitalization's rising potential and building organizational capacity to realize organizations' commercial benefits. As previously said, digital innovation can help businesses compete, survive, and thrive in competitive markets and settings. It explicitly moderates the accounting information quality-sustainable business growth relationships ($b = 0.64$, $p < 0.05$) and the decision making effectiveness-sustainable business growth relationships ($b = 0.72$, $p < 0.01$). Accordingly, digital innovation can strengthen the aforementioned research relationships and change the direction of these relationships. *Therefore, Hypotheses 6d-6e are supported.* Surprisingly, digital innovation does not moderate the big accounting data-accounting information quality relationships ($b = 0.14$, $p < 0.46$), the big accounting data-decision making effectiveness relationships ($b = 0.23$, $p < 0.14$) and the big accounting data-sustainable business growth relationships ($b = 0.17$, $p < 0.40$). According to existing research, digital technology

Table 5: Results of Multiple Regression Analysis and Hypotheses Testing[a]

Independent Variables	Dependent Variables				
	AIQ	DME	SBG	SBG	SBG
BAD	0.22	0.13	0.35*		
	(0.14)	(0.20)	(0.15)		
AIQ				0.42	
				(0.18)	
DME					0.11
					(0.13)
DIN	0.98***	0.69***	0.75***	0.32	0.43*
	(0.14)	(0.14)	(0.15)	(0.19)	(0.18)
BAD*DIN	0.14	0.23	0.17		
	(0.17)	(0.14)	(0.19)		
AIQ*DIN				0.64**	
				(0.16)	
DME*DIN					0.72***
					(0.14)
FA	0.25	0.10	0.19	0.34	0.36
	(0.01)	(0.08)	(0.18)	(0.18)	(0.15)
FS	0.01	0.23	0.15	0.03	0.08
	(0.18)	(0.10)	(0.08)	(0.08)	(0.08)
FC	0.21	0.22	0.19	0.26	0.08
	(0.10)	(0.14)	(0.11)	(0.12)	(0.15)
Adjusted R^2	0.45	0.40	0.43	0.44	0.44

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$, [a] Beta coefficients with standard errors in parenthesis.

is a key driver in incorporating both big accounting data and digital innovation in a company. Firms using big accounting data can thus deliver high-quality accounting information, improve decision-making effectiveness, and achieve sustainable business growth without relying on digital innovation to strengthen research linkages. *Therefore, Hypotheses 6a–6c are not supported.*

5. Implications and Directions for Future Research

5.1. Theoretical Implication and Directions for Future Research

In this study, information richness theory is empirically confirmed. It verifies that firms with rich information can facilitate more insight and rapid understanding of competitive markets and environments and build competitive advantages and success in these markets and environments. To confirm and expand the research relationships, future research may need to identify dimensions of big accounting data by using an inductive approach through a grounded theory. To investigate the effects of each dimension on business outcomes, future research may need to prove these effects. Next, future research may need to search for other moderators to strengthen the research relationships in cases of rejected hypotheses. These moderators may include top management support, transformational leadership, organizational learning, resource readiness, and strategic renewal. In addition, overall research relationships are confirmed. However, future research may add antecedents of implementing big accounting data in the conceptual model, including internal and external factors, to fulfill and enhance completed research relationships. In addition, future research may collect data from two data sets or more, such as different industries in one country and one industry in different countries, by using a comparative study. Lastly, comparing the research results, future research may apply several statistical techniques to test the main research relationships. These statistical techniques comprise of structural equation model, multiple regression analysis, and partial least squares regression.

5.2. Managerial Implication

Interestingly, big accounting data plays a significant role in driving sustainable business growth. It is a strategic valuable instrument of firms in successfully doing and operating businesses. Thus, big accounting data is a source of sustainable competitive advantages in competitive markets and environments. Accordingly, firms must implement big accounting data in an organization through learning, understanding, investing, and utilizing its concepts, attributes and qualifications. Big accounting data can

successfully assist businesses in implementing important and relevant strategies and methodologies, enhancing long-term competitive advantage and competitiveness, and promoting better performance, growth, survival, and sustainability in changing contexts. Furthermore, businesses must assist their employees and staff in enhancing, developing, and implementing a helpful big accounting data system. Greater big accounting data systems can help businesses better accomplish and operate business practices, activities, and functions by encouraging and fulfilling their talents, capabilities, and potentials.

6. Conclusion

Big accounting data is a strategic tool for companies to do and run their enterprises. It's a key factor in gaining a competitive advantage and ensuring success, survival, growth, and sustainability in competitive markets and settings. Through mediators of accounting information quality and decision-making effectiveness, as well as a moderator of digital innovation, this study aims to determine the impact of big accounting data on the sustainable business growth of listed enterprises in Thailand. The study's useful samples are the 289 listed Thai companies. To examine the research relationships, the structural equation model and multiple regression analysis are used in this study.

The results of this study present that big accounting data significantly affects accounting information quality, decision-making effectiveness, and sustainable business growth. In addition, accounting information quality has a significant effect on both decision-making effectiveness and sustainable business growth while it explicitly mediates the big accounting data-sustainable business growth relationships. Next, decision-making effectiveness is significant and it critically affects sustainable business growth. It has the ability to mediate the relationships between big accounting data and sustainable business growth. Digital innovation explicitly moderates the accounting information quality-sustainable business growth relationships and the decision-making effectiveness-sustainable business growth relationships to enhance the research relationships. Surprisingly, the rest of the research relationships are not moderated by digital innovation. Accordingly, firms can implement big accounting data for creating valuable strategies and techniques, gaining sustainable competitiveness, and achieving outstanding and long-term performance under various and uncertain environments. To verify and increase the benefits and contributions of the research relationships, future research may need to identify dimensions of big accounting data and test their effects, search for other moderators to strengthen the research relationships, add antecedents of implementing big accounting data in the conceptual model, collect data from two data sets or more

by using a comparative study, and apply structural equation model, multiple regression analysis and partial least squares regression to test the main research relationships.

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Appendix A: Measurement of all Variables

Items
Big accounting data
BAD1: Firms have created information systems and activities which accumulate, retrieve, and examine dynamic, large, and disparate volumes of accounting data through digital goods and technologies.
BAD2: Firms have provided a collection, collation, and analysis of enormous data quantities made available on social networks to improve business performance via an accounting function.
BAD3: Firms have provided the magnitude of accounting data and information in both financial and non-financial aspects and both formal and informal views.
BAD4: Firms have provided an increased rate of accounting data generation and potential processing.
BAD5: Firms have provided the desired diversity in the type of accounting data and information in both financial aspects and other related data and information.
BAD6: Firms have provided freedom from mistakes or errors and overall consistency of accounting data and information.
BAD7: Firms have been aware of and provided the benefits over costs of accounting data and information.
BAD8: Firms have aggregated transactional records and adjustments of accounting data and information made both internally and externally.
BAD9: Firms have fulfilled a demand for atomized, reconfigurable, and transparent accounting data and information that fit with firms' needs and wants.
Accounting information quality
AIQ1: Firms have presented to the extent to which accounting data and information are selective restrictions of access.
AIQ2: Firms have presented to the extent to which accounting data and information are available or easily and quickly retrievable.
AIQ3: Firms have presented to the extent to which accounting data and information are correct, reliable, and certified free of error.
AIQ4: Firms have presented to the extent to which the quantity or volume of available accounting data and information is appropriate.
AIQ5: Firms have presented to the extent to which accounting data and information are accepted or regarded as true, real, and credible.
AIQ6: Firms have presented to the extent to which accounting data and information are well documented, verifiable, and easily attributed to a source.
AIQ7: Firms have presented to the extent to which accounting data and information are compactly represented without being overwhelming.
AIQ8: Firms have presented to the extent to which accounting data and information are always presented in the same format and are compatible with the previous format.
AIQ9: Firms have presented to the extent to which accounting data and information are clear, without ambiguity, and easily comprehended.
AIQ10: Firms have presented to the extent to which accounting data and information are inappropriate language and units and the accounting data definitions are clear.
AIQ11: Firms have presented to the extent to which accounting data and information are unbiased and impartial.

Accounting information quality
AIQ12: Firms have presented the extent to which accounting data and information are applicable and helpful for the task at hand.
AIQ13: Firms have presented to the extent to which accounting data and information are trusted or highly regarded in terms of their source or content.
AIQ14: Firms have presented to the extent to which the age of the accounting data is appropriate for the task at hand.
AIQ15: Firms have presented the extent to which accounting data and information are beneficial and provide advantages for their use.

Decision-making effectiveness
DME1: Firms have made decisions through achieving the objectives and aims established by management at a proper time within the considered constraints.
DME2: Firms have achieved the expected proportion of correct choices and the judgment conformity of normative benchmarks under the existing conditions.
DME3: Firms have always determined the best available alternative and the most effective of the organization.
DME4: Firms have been more effective at understanding customers, making real-time decisions, and responding more quickly to change.
DME5: Firms have exactly understood and identified the appropriate actions and reactions for matching internal resources with the competitive environments.
DME6: Firms have sustained profit growth, fulfilled management satisfaction, and met the expected results by choosing the best ways of operations and activities.
DME7: Firms have influenced better organizational outcomes through strategic choices.

Digital innovation
DIN1: Firms have created market offerings, business processes, or models that result from the use of digital technology.
DIN2: Firms have developed and implemented new products, services, and solutions by using digital technology as a means or end within and across organizations.
DIN3: Firms have combined digital and physical components for creating new processes, solutions, and business models and producing novel products, platforms, and services.
DIN4: Firms have changed their products, services, and business models and created new customer experiences and other value pathways through the use of digital technology.
DIN5: Firms have generated, accepted, and implemented new ideas in products, services, and models through the increasing pace of advanced digital technologies with modes of operating businesses.
DIN6: Firms have concerned with both innovative digital solutions and complementary digital business concepts.
DIN7: Firms have derived value from the growing opportunities of digitalization and developed the organizational capacity to recognize firms' business benefits.

Sustainable business growth
SBG1: Firms can achieve the business success that relates to the value creation process of firms and longer survival endeavors.
SBG2: Firms can obtain long-term financial goals and organizational performance over time periods within firms' abilities and capabilities.
SBG3: Firms can affirm future accomplishments without jeopardizing their long-term existence.
SBG4: Firms can gain the maximum pace at which they can increase revenue and its economic, social, and environmental capital without depleting their financial resources and decreasing these capital stocks.
SBG5: Firms can achieve sustainable business growth through implementing great valuable strategies and techniques for competing in the markets and environments.
SBG6: Firms can accomplish long-term profitability margin, success, and survival.