The Effect of Business Intelligence on Business Unit Strategies, International Operations and Business Growth

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ABSTRACT

The development of business decisions using information technology, an increase of international business operations and the emergence of new markets have led to a new paradigm of business management that is operated necessarily in a holistic way. This study tested the model that combined the use of information technology, business strategy, and international operations in relation to the business growth of small and medium enterprises in Thailand. The model was created with mediators, and tested by the Structural Equation Model. The collected data was derived from business firms from various industries. The results indicate that a crucial aligning of the business model includes three important factors that demonstrate business growth. Hence, in conclusion, entrepreneurs should be aware to facilitate information technology in terms of business intelligence to encourage strategies and international operations that will finally support business growth.

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1. INTRODUCTION

The application of data to business strategies has been increasingly achieved through the use of Semantic Web technologies. The use of real-time systems, including social networks, cameras and sensors, tends to imply that the data links are huge and need to be analyzed (Aufaure, Chiky, Curé, Khrouf, & Kepeklian, 2016). These data are not only used within a firm, but need to be integrated and shared among firms. For example, for business firms along the supply chain, information sharing with suppliers is crucial to the strategic decision making process which operates as an indicator of the key dimensions that have an impact on firms' competitive advantage (Banerjee & Mishra, 2017). An IT infrastructure can support data analysis which is based upon business strategy both to inform and shape management towards the implementation of the business strategy (Ba?i? & Fadlalla, 2016). In fact, a greater competitive business environment requires business firms to use numerous varieties of data from various sources in their decision making for every function within the organization.

Moreover, high competitiveness in technologies that have been applied to every part of an organization can cause rapid change and become disruptive and business intelligence may be reshaped by wide engagement of data analytics that have been embraced as a disruptive technology (Fan, Lau, & Zhao, 2015). Such a process will be benefit those firms who apply business intelligence in their operations to reduce risk. In addition, business intelligence can also be a beneficial support for risk management (Sodeyfi & Katircioglu, 2016; Wu, Chen, & Olson, 2014). Systematic data will also offer support to management particularly in their long term strategic planning and decision making. However, small and medium-size enterprises (SMEs) have underestimated the dynamics of business intelligence and its benefit to the implementation of a business system. Enterprise Resources Planning (ERP) has been applied as part of the operation but this does not significantly contribute decision making data. In addition, SMEs have found they are within a new era for their firms' management.

Strategic management is vital to their sustainable growth since it helps management in the long term planning of limited resources usage to achieve their goals and also to adapt plans to fit the dynamic environment. Moreover, the operation of SMEs is not only within their home country, but also conducted internationally to gain a higher market share as well as business growth. Therefore, this study will provide the results uncovered of linkage between the above-mentioned variables.

2. LITERATURE REVIEW

An analysis of business information to support decision making across a broad range of business functions needs a business intelligence system (Elbashir et al., 2008). Management should consider the specific context when applying an information technology intensive system to their operation which highlights the contextual moderators of the firm's performance. To achieve this aim, firms must acquire greater information for their operation. The more information intensive an industry, the more business intelligence is needed. The information can be used specifically to expand their markets. This information would include customers, competitors, as well as coordination within the firm. There is a relationship between information and business performance (Kuntonbutr, 2013). Current business firms use business intelligence (BI) to support their decision making with information that is easily accessed and well managed (Brichni et al., 2017). Therefore, business intelligence will cover the overall information system in an organization. Staff can be supported in terms of easily accessed information. Moreover, this information will support decision making at every level by every function, specifically marketing activities that require prompt decision making. Business intelligence can encourage performance measurement capabilities, and relate positively for the firms' competitive advantage (Peters et al., 2016).

In addition, investment in business intelligence is a first necessary factor that firms can use for improving operational efficiencies (Trieu, 2017). That will affect business growth that can be observed in a variety of measurements such as the capability of employees, new markets, new products, and operational results. Moreover, expanded data can provide information on the international business scene that is currently needed by every firm no matter their size. Business firms can have a sustainable operation from their market share and an economy of scale that cannot depend on the domestic market alone. To develop an international operation, firms need both external and internal information which is considered using a holistic approach. This business intelligence will support convenient accessing, low cost, and an on-time manner.

Business strategy is important to business firms as it provides a long term plan for any firm to achieve its goals. Those plans concern the application of all limited resources to gain a better performance. The effective use of available resources supports the coordination of various functions within firms and their need for the connection of data between functions. Therefore, many companies have developed wide-spread data analysis, capable of enhancing the firm's performance (Akter et al., 2016). This large data source needs to be organized by an information system referred to as business intelligence. Business intelligence is crucial for the pace and magnitude of business value creation (Williams, 2016). Consequently, business strategies include the building of the value creation of the firm's products. The growth of a rapid dynamic within the business environment, such as through competition, needed information, innovation and rapid change in development, management would need to consider strategies that best respond to such turbulent environments (Ben Romdhane Ladib & Lakhal, 2015). They need to follow up on particular competitor products, perhaps providing different products, which will consequently support their firm's growth.

Encouraged by an internationalized of business environment, many SMEs highlight their strategies by heading up international operations. In a globalization era, business firms are forced to expand their operations across borders to increase their competitive advantage which will support sustainability performance. To gain competitive advantage over competitors, firms need to have products or services that are different from other competitors in the same market. This can be achieved through the capacity of particular firms to innovate for foreign customers or markets. The capability of firms to develop and introduces new products or services for the international market is defined as international innovativeness (Ibrahim et al., 2016). This will create a competitive advantage for firms, and gain them more foreign customers. SMES always use exports as the mode of entry into foreign markets. Their customers can be determined along the supply chain. International customers in the supply chain can form an indispensable element for a sustainable strategy (Yeniyurt et al., 2013). Furthermore, the success of firms' export performances comes from the coordination between functions within firms. Firms need an integrated experience and expert employees to facilitate an operation which responds to the export environment (Gnizy et al., 2017).

Hence, employees' capability within a foreign operation is important to a firm's success. However, studies which focus on business intelligence and the international operations of Thai SMEs are very limited. Thus, this study aims to explore the relationships that may affect the business growth of SMEs.

Currently, the internet has facilitated the development of business intelligence in terms of being an information provider, and acting as a source of global data. Firms that have internet marketing capability find this tool can have a positive impact on their international growth (Mathews et al., 2016). In addition, globalization and rapid trading growth across borders all has an impact on the rise of SMEs from emerging from local markets to operate internationally. This growth indicates that they can increase their marketing orientation and business growth. Consequently, they will demonstrate experience in using technology to expand their operations in other countries. Moreover, SMEs can learn from foreign subsidiaries how to create their firms' capabilities in technology (Liang, 2017). The evidence shows technology spillover from foreign affiliates into their partners' firms in the host country (Elmawazini, 2015). As well, the rapid development of the internet and digital technologies has supported low cost and prompt global communication for all firms involved. Consequently, an opportunity for SMEs to involve themselves in internationalization and/or innovation is available since the size of the firm does not appear to be relevant in the determination of its potential for doing so (Nordman & Tolstoy, 2016). SMEs should consider their international operations in terms of preparing a plan to operate overseas and preparing their employees for an overseas operation. Following the findings of prior literatures, the following model was posited for testing.

3. METHODOLOGY

This study uses quantitative analysis and aims to estimate business intelligence and business growth, with business unit strategy and international operation acting as mediators. The questionnaire developed was based on previous literature reviews and from discussions with a group of three experts working in both global and local firms. After its composition, its validity and reliability was then investigated. The 555 research subjects all came from small and medium enterprises in the Bangkok area and vicinity. The survey investigated the employees at the level of supervisors or managers, all of them from an educational background at bachelor to master degree level. Since the data set has two mediators, business unit strategy and international operation, Structural Equation Modeling (SEM) was used to test and analyze it.

4. RESULTS AND DISCUSSION

This study analyzed the model composed of business intelligence in relation to business growth. The two mediators, business unit strategy and international operation, were found to create an indirect effect on business growth. The results of statistical analysis are presented below. This section presents the results from the conceptual framework. The results were summarized from the proof of the structural equation model fit. The overall model is presented as measurement. The hypotheses were then tested, indicating the finding for the overall model. According to the reliability result, this study applied Cronbach's Alpha to the overall items, specifically to investigate the variables. The results indicating Cronbach's alpha between 0.850 and 0.940 convince for high reliability (Table 1).

Table 1. Reliability Statistics

Variable	Cronbach's Alpha
Business Intelligence	0.850
Business Unit Strategy	0.909
International Operation	0.940
Business Growth	0.900

As the framework will be tested by a structural equation model that is based upon regression analysis, the multi-collinearity between the independent variables needs to be tested. The tolerance and variance inflation factor)VIF(are measurements for approval .The tolerance should be more than 0.1, or the VIF should be less than 10)VIF = 1 /tolerance(. The test result indicated that the tolerance and VIF fall between the range that indicates no multi-collinearity found (Table 2).

Table 2. Collinearity Statistics Testing Compare with BI1

Variable	Collinearity Statistics	
	Tolerance	VIF
BI2	.368	2.714
BI3	.364	2.744
BI4	.336	2.975
BUS1	.550	1.819
BUS2	.454	2.203
BUS3	.428	2.337
BUS4	.445	2.247
IO1	.267	3.747
IO2	.225	4.440
IO3	.217	4.618
IO4	.193	5.187
BG1	.425	2.350
BG2	.367	2.722
BG3	.334	2.995
BG4	.316	3.162
BG5	.374	2.671

To ensure that the instrument will directly meet the needs of model, the construct validity and discriminant validity were tested. The convergent validity was measured by the value of confirmatory factor analysis (CFA) to ensure their loading factor would be greater than 0.6. The result found the average extracted variance)AVE(of all variables was above .5. Moreover, the discriminant validity was tested by examining the correlation between the construct and the correlation observed between the variables which should be less than 0.85. The results of the AVE are presented in Table 3 for factor loading, critical ratio, R^2, composite reliability and average variance extracted.

Table 3. Results of the AVE

Variable	Composite Reliability	Average Variance Extracted
Business Intelligence	0.911	0.718
Business Unit Strategy	0.852	0.591
International Operation	0.940	0.797
Business Growth	0.900	0.644

The results of Correlation Matrix is presented in Table 4.

Table 4. Correlation Matrix

Variable Name	**1**	**2**	**3**	**4**
1.Business Intelligence	0.515			
2.Business Unit Strategy	0.63	0.349		
3.International Operation	0.74	0.57	0.635	
4.Business Growth	0.71	0.74	0.73	0.414

In summary, for the model fit, the result of the measurement model indicated that the Normed Chi-Squared fit index derived from the Chi-Square/degrees of freedom is 1.78, indicating a good fit model .The value of Goodness of Fit Index (GFI), and the Adjusted Goodness of Fit is .954, and .929 respectively .The Root Means Square Error of Approximation (RMSEA) is .044 .The Normed fit index and Comparative Fit Index (CFI) value equal .969, and .986 .All data sets (see Table 5) indicate an appropriate fit for this specific model.
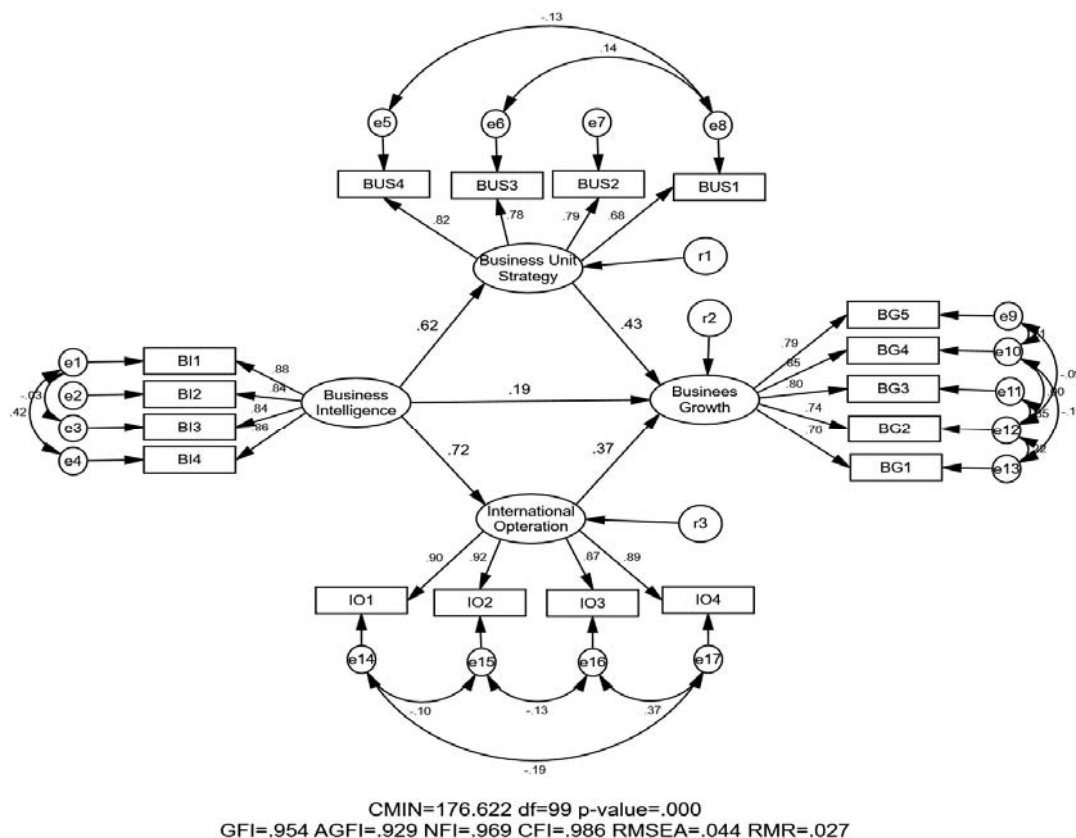
CMIN=176.622 df=99 p-value=.000
GFI=.954 AGFI=.929 NFI=.969 CFI=.986 RMSEA=.044 RMR=.027

Figure 1.
Statistic Model

Table 5 indicates that business intelligence has a significant impact on Business Unit Strategy) β.=62 with p-value <.001(, International Operation)β.=72 with p-value <.001(, and Business Growth)β.=19 with p-value <.001(.

Table 5. Assessing the Model Fit Indicators

Chi-square/Degree of freedom)CMIN/df(	1.78
Goodness of Fit Index)GFI(	.954
Adjusted Goodness of Fit Index)AGFI(	.929
The Root Means Square Error of Approximation)RMSEA(	.044
Normed fit index (NFI)	.969
Comparative Fit Index)CFI(	.986

Besides, Business Unit Strategy has a significant impact on Business Growth)β.=42 with p-value <.001(and International Operation has a significant impact on Business Growth)β.=37 with p-value <.001(.

Table 6. Standardized Direct and Indirect Effect

	R^2	Direct Effect			Indirect Effect			Total Effect		
		BUS	IO	BG	BUS	IO	BG	BUS	IO	BG
BI		.618	.722	.194			.529	.618	.722	.723
BUS	.382			.429						.429
IO	.522			.194						.194
BG	.741									

R^2 = Coefficient of Determinant

Table 6 demonstrates that business intelligence has an indirect impact on business growth – BG - (β.=529). Meanwhile, business intelligence – BI - has a direct effect of .194. These findings indicate that business intelligence have effect to business growth through the business unit strategy – BUS - and international operations - IO. In addition, the coefficient of determinant R^2 of the research results shows that the business unit strategy, the international operations and business growth maintain an accuracy of 38.2%, 52.2% and 74.1%, respectively. Furthermore, the measurement models for business intelligence, the business unit strategy, the international operations, and business growth were tested using structure equation modeling. The survey used 17 items, measured on a 5-point scale ranging from 1 to 7. Business intelligence was measured using four items. The mean score for this was 3.93 and the Standard Deviation was 1.027.

The results of the business intelligence study indicate that applying IT to the marketing activities has the highest mean of 4.09 with a SD of 1.043; this is followed by the application of IT for access to the available information with a mean of 4.02, and a SD of 0.975. In considering the business unit strategy, the mean score was 4.02 and the Standard Deviation was 0.876. The only two items in the business unit strategy revealed that following the product prices of competitors had a mean of 4.06 with a SD of 0.892; followed by a focus on products and services which revealed a difference from the competitors with a mean of 4.04 with a SD of 0.860. To determine the international operations, the results uncovered a mean of 365 and a Standard Deviation of 1.228. Next, the results of a statistical analysis of the variables indicate that international marketing activities have continuously increased with a mean of 3.68, and a SD of 1.260, followed by having an international business plan indicates a mean of 3.66, and a SD of 1.241. On the other hand, the new market mean score was 3.91, and the SD was 0.925. The business growth revealed a trend in an expansion to new markets presenting a mean of 3.93, with a SD of 0.950. This was followed by having satisfactory operation results in a current situation with a mean of 3.91 with a SD of 0.922; and having a trend of expanding to new products shows a mean of 3.91 with a SD of 0.902.

5. CONCLUSION

This study tested the model that combined the use of information technology, business strategy, and international operations in relation to the business growth of small and medium enterprises in Thailand.The findings are set out to illustrate the current research's model which used subjects from a variety of industries. This concept was proposed by Porter (1984) and that for business intelligence by Trieu (2017). In addition, the research aim was at a business practice which was congruent with the global integration of current economic and business operations. The conclusions highlight results which have the potential to make an important contribution to business implications. First, business intelligence was found to make a direct impact on business growth. The research investigation indicates that this means that the application of IT across an entire organization to support information assessing, decision making, and marketing activities will have an impact on a firm's human capability, market growth, new product development, and satisfactory operating results. Second, business intelligence has an indirect impact on business growth via both business unit strategy and international operations.

In considering the effect of business intelligence on business unit strategy, business intelligence is shown to support the management of strategy in terms of competitor information and encouraging product differentiation. Third, similar to the effect of business intelligence on business unit strategy, business intelligence offers support to firms in their exports to foreign markets, their international activities, international operation planning, and the capability of their employees in international operations. Finally, business strategy and international operations yield business growth. SMEs should consider business intelligence as a crucial system within their operations since it will support cooperation amongst all functions and support the firms' business growth. Lastly, the academic contributions of this study lie in its provision of links between business intelligence, business unit strategy, and international operations that are rarely found in previous research studies, perhaps mainly because most scholars tend to focus on specific area. The key limitation of this study is that business growth was not measured by financial data. Therefore, it is recommended that future scholars and investigations might consider conducting their studies by applying information on financial performance to the determination of business growth.

also express our appreciation to Professor Dr. Antonio Niche from Westfälische Hochschule Gelsenkirchen Bocholt Recklinghausen University of Applied Sciences, Germany, who had suggested us along the period of conducting this study.

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