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Strategic Orientations, Access to Finance, and SMEs Performance in Thailand: Data Screening and Preliminary Analysis

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Abstract This study aimed to conduct a data screening and preliminary analysis about the effect of strategic orientations towards SMEs performance and the moderating effect of access to finance in Thailand's gem and jewelry industry. Samples of 310 were selected from the population of 1,601 SMEs operating in Thailand's gem and jewelry business using a systematic sampling technique to collect the data. In addition, data diagnostics were performed to meet the preliminary assumptions for further multivariate analysis, particularly an advanced Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis. Thus, the study carried out response rate, missing data analysis, non-response bias test, normality test, assessment of outliers, common method bias test, and multicollinearity test. Likewise, all the assessments were conducted through the IBM SPSS 20, G*Power 3.1, and SmartPLS 3.2.8 software. Conclusively, the data met the requirements for further multivariate analysis, but the normality test still needed to be met. Although, the normality assumption was not met, the non-normally distributed samples can be analyzed further since PLS-SEM works well with non-normal data distributions. This study contributes to the current literature as it will steer other researchers in conducting data screening and preliminary analysis.

Keywords SMEs; Gem and jewelry industry; Thailand; Data screening; Preliminary analysis

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Introduction

Presently, small and medium-sized enterprises (SMEs) play a main role in fostering the growth of domestic economies in many countries. In Thailand, SMEs have been recognized as an important tool for boosting the growth of the national economy and generating particularly SMEs in the gem and jewelry industry. According to the monthly SMEs White Paper Report in June 2018 revealed that highest export value among the top ten Thailand SMEs export sectors was the gem and jewelry industry, which accounted for 15.2 percent of the export value at USD 813 million (Office of Small and Medium Enterprises Promotion [OSMEP], 2018). Despite the fact that SMEs have played a main role in the Gross Domestic Product (GDP) growth and new job creations, they have encountered many constraints that affect their performance. Problems faced by Thailand SMEs in the gem and jewelry industry are the need for more competitive advantage in the markets and access to finance (Department of International Trade Promotion [DITP], 2018). The study on the impact of sources of competitive advantages, such as entrepreneurial orientation (EO), market orientation (MO), and learning orientation (LO), on SMEs performance relationships has yet to be explored, needs more attention. Particularly, the moderating effect of access to finance on those relationships has yet to be explored. Thus, the knowledge gaps on the moderating effect of access to finance and influences of strategic orientations (EO, MO, and LO) towards SMEs performance in Thailand's gem and jewelry need to be investigated. Data diagnostics (data screening and preliminary analysis) was conducted in this study because the procedure is a part of the hypothesis-testing process that involves preparing data to be accurate for statistical analyses (Martin & Bridgmon, 2012, p. 100). After the main data was collected, this study examined issues related to data diagnostics, including; response rate, missing values, response bias, normality, outliers, common method bias, and multicollinearity in order to have free error data before they were analyzed (Raykov & Marcoulides, 2008). The remainder of the paper is organized as follows; introduction, literature review concerning Thailand's gem and jewelry industry, strategic orientations, and access to finance. Then, the methods used in this study, were highlighted, and the results were analyzed. The final section, drew a conclusion based on data screening and preliminary analysis results.

Literature review

Thailand is one of the world's largest suppliers of high-quality gem and jewelry products. The gem and jewelry industry plays a major part in the national economy and job creation. According to the Gem and Jewelry Institute of Thailand (GIT) (2018), the industry generates almost USD 30 billion of capital in Thailand's economy. It creates 800,000 employees in three major sectors, including; colored stone polishing, diamond polishing, and jewelry manufacturing. Most of the operators in the industry are small and medium-scaled manufacturers, and 80% of its production is export-oriented, while 20% is for domestic distribution (GIT, 2018). Pongyeela (2012) claims that Thailand has become one of the world's top ten gem and jewelry exporters due to the country having a rich history in gems and jewelry, cheap labor costs, and excellent craftsmanship. The competition in the industry has been increasing since the arrival of new entrants from China, Singapore, Malaysia, and India, and the cheap labor cost is no longer a competitive advantage (Nitisathian & Walsh, 2011). As a result, Thailand's gem and jewelry export value under HS71, the Harmonized Tariff Schedule, from 2012 to 2017 dropped by 2.39% to USD 12,832.96 million from USD 13,147.55 million (GIT, 2018). Since previous studies have revealed that strategic orientations influence the firms' performance, owner-managers should consider it to improve their competitive advantage and enhance firm performance.

Strategic orientations can be viewed as principles that steer the activities of a firm to ensure the viability and performance of the firm (Hakala, 2010). The present study focuses merely on entrepreneurial orientation (EO), market orientation (MO), and learning orientation (LO) as the main

contributors to the performance of the firm. The literature indicates that EO, MO, and LO influence firm performance, but studies need to investigate the effect of these three orientations on firm performance within a single study (Hakala, 2010). EO refers to the processes, practices, and decision-making activities of a firm that lead to new entry, which is characterized by innovativeness, proactiveness, risk-taking (Covin & Slevin, 1989; Miller, 1983), competitive aggressiveness, and autonomy (Lumpkin & Dess, 1996). Likewise, MO refers to a cornerstone of the marketing concept that a firm behaves to create superior value for target customers. MO can be conceptualized from the behavioral perspective consisting of intelligence generation, intelligence dissemination, and responsiveness (Kohli & Jaworski, 1990), and also from the cultural perspective, including; customer orientation, competitor orientation, and inter-functional coordination (Narver & Slater, 1990). Similarly, LO can be viewed as a set of organizational values influencing a firm to create and use knowledge associated with commitment to learning, open-mindedness, and shared vision (Sinkula et al., 1997). In addition, financial resources are considered essential factors to the survival of any firm (Shamsudeen et al., 2017). The firm's operating power and potential growth are at risk due to a lack of access to finance (Adomako et al., 2016). Arora (2014) opines that access to finance covers access to various financial products and services, such as bank credit and financial advisory services.

Research methodology

In this study, descriptive and inferential statistics were employed to analyze the data with the aid of IBM SPSS 20, G*Power 3.1, and SmartPLS 3.2.8 software. The sample of this study derived from owner-managers of SMEs operating in the gem and jewelry business in Thailand. Samples of 310 were selected from the population of 1,601 SMEs using Dillman's formula (Dillman, 2007). The systematic sampling technique was used to collect the data, and hence, 118 usable responses were retrieved from SMEs operating in the gem and jewelry industry in Thailand. After pilot testing, this study adopted the measures using a one-dimensional construct on a five-point Likert scale. SMEs performance developed by Wu and Lu (2012) based on the concept of balanced scorecard (BSC) was used to assess the financial perspective, customer perspective, internal process perspective, and learning and growth perspective using 17 items. Similarly, EO was adopted by Eggers et al. (2013) and contains 14 items to measure innovativeness, proactiveness, and risk-taking. Likewise, a 14-item scale developed by Charles et al. (2012) was employed to measure MO, including customer orientation, competitor orientation, and inter-functional coordination. In like manner, LO was assessed using a 12-item scale developed by Hakala (2013) to measure the commitment to learning, shared vision, and open-mindedness. In addition, access to finance was adopted by Aminu and Mohd Shariff (2015) using a 4-item scale to assess the capability of SMEs to obtain financial resources. Thus, the subsequent technique of data analysis was implemented to analyze the data. Firstly, missing data analysis was conducted to detect missing values. Secondly, non-response bias test, normality test, and assessment of outliers were assessed to meet the preliminary assumptions for further analysis. Finally, the study assessed the data to describe variables regarding common method bias and multicollinearity.

Research findings

Response rate

Before starting data collection, e-mails were sent to the respondents requesting cooperation to complete the questionnaire and return it within two months. Hence, mailed surveys of 310 questionnaires were sent, 42 copies of questionnaires were retrieved from January 26th, 2017, to February 23rd, 2017, and a total of 37 questionnaires were usable (the early month), whereby the postcard reminders were sent at the end of the second week of questionnaire distribution to follow up for improving response rates (Brennan, 1992). Since the response rate was low for the mailed

questionnaire survey approach, giving only 11.9%, the personally administered questionnaire approach took place in the late month. Copies of 268 questionnaires were handed over again by the researcher and an assistant researcher to the respondents who had yet to reply in the early month at the 59th Bangkok Gems and Jewelry Fair from February 22-26, 2017, a total usable of 81 questionnaires were retrieved. Therefore, overall, usable 118 questionnaires (37+81) were found to be useful for further analysis accounted for 38.1% valid response rate, which is quite satisfactory for studies involving top management or organizational representatives, given that average is 36.1% (Baruch, 1999). Hence, the response rate of this study is considered satisfactory for analysis and reporting (see Table 1). Interestingly, the present study requires merely a minimum of 85 samples as determined by the G*Power 3.1 software using the following parameters; effect size f^2 (0.15), power 1-ß (0.8), four predictors (EO, MO, LO, and access to finance), and significance level α (0.05). In addition, a sample of 118 selected SMEs for the study was more than adequate for data analysis since power 1-ß of 0.93 was accompanied by the G*Power software.

Table 1 Questionnaire distribution and response rate

Response	Frequency
Distributed questionnaires	310
Returned questionnaires	154
Questionnaires not returned	156
Returned and usable questionnaires	118
Returned and excluded questionnaires	36
Valid response rate %	38.1%

Missing data analysis

Missing data has become a serious concern in every research study. Data with missing values can create problems that lead to biased results when data analysis is performed (Zainuri et al., 2015). Two main methods have been proposed to handle missing values; the deletion and imputation methods the latter of which, helps protect sample size, (Cokluk & Kayri, 2011). Kock (2014) claims the imputation methods perform better in partial least squares structural equation modeling (PLS-SEM) research study. The mean, median, or mode of valid observed values can replace a missing value (Zhang, 2016). In addition, Hair et al. (2014) suggest that missing values of an indicator variable should be replaced using the mean when fewer than 5% of values missing per that indicator variable. By contrast, there are limitations to using the mean imputation method including: 1) sample size is overestimated; 2) variance is underestimated; 3) correlation is negatively biased; and 4) the mean is affected by the presence of outliers (Acuna & Rodriguez, 2004). Hence, the study employed the median imputation method to deal with missing values through IBM SPSS 20 software, whereby the observation was removed from the data file when the number of missing data on a questionnaire exceeded 15% (Hair et al., 2014).

Non-response bias test

Non-response bias has been regarded as a critical issue affecting the quality of research results, leading to inaccurate, unreliable, and misleading predictions (Clottey & Benton, 2013). The issue of non-response bias arises when sampled individuals responding to a survey differ from nonrespondents (Reio, 2007). By contrast, non-response bias will not threaten a study's external validity when achieving a 100% response rate (Lindner et al., 2001). In addition, Clottey and Grawe (2014) opine that the most commonly used method to test non-response bias is a comparison of responses from early and late respondents that usually use the independent samples t-test along with the statistical power.

Hence, the independent samples t-test and statistical power analysis were conducted in this study to test any significant differences between the two groups on key variables; EO, MO, LO, access to finance, and SMEs performance. In order to test non-response bias, the respondents were divided into two groups based on the returned survey period, early respondents (n = 37) and late respondents (n = 81). Consequently, the results of two-tailed independent samples t-test with equal variances assumed indicated that no significant differences were found between the two groups (see Table 2); EO (t = .267, p = .790), MO (t = 1.122, p = .264), LO (t = 1.024, p = .308), access to finance (t = -.367, p = .714), and SMEs performance (t = 1.292, p = .199). Furthermore, the statistical power analysis showed that the power of t-test was 0.805, which achieved a minimum acceptable power (0.8) at the medium effect size (Johnson & Shoulders, 2017). Based on the t-test results, there was no difference between the early and late respondents. Thus, there was no issue of non-response bias in the study.

Table 2 Independent samples tests for equality of means

		T-test for equality of means						
		t	df	Sig. (2-tailed)	Mean difference	Std. Error difference	95% Confidence interval of the difference	
							Lower	Upper
EO	Equal variance assumed	0.267	116	0.79	0.025	0.095	-0.162	0.213
	Equal variance not assumed	0.279	77.2	0.781	0.025	0.091	-0.155	0.206
MO	Equal variance assumed	1.122	116	0.264	0.113	0.101	-0.087	0.313
	Equal variance not assumed	1.291	99.15	0.2	0.113	0.088	-0.061	0.287
LO	Equal variance assumed	1.024	116	0.308	0.098	0.095	-0.091	0.287
	Equal variance not assumed	1.053	74.79	0.296	0.098	0.093	-0.087	0.283
ATF	Equal variance assumed	-0.37	116	0.714	-0.048	0.131	-0.307	0.211
	Equal variance not assumed	-0.37	70.14	0.714	-0.048	0.131	-0.308	0.212
PER	Equal variance assumed	1.292	116	0.199	0.137	0.106	-0.073	0.348
	Equal variance not assumed	1.388	83.58	0.169	0.137	0.099	-0.059	0.334

Note: EO = Entrepreneurial Orientation; MO = Market Orientation; LO = Learning Orientation; ATF = Access to Finance; PER = SMEs Performance.

Normality test

According to Razali and Wah (2011), the preliminary test of normality is an important step before preceding any statistical procedures because when the normality assumption is violated then the interpretation may not be valid. Although PLS regression is seen to perform well with both normal and non-normal data (Kock, 2016), PLS-SEM estimates are less precise under non-normal conditions compared to covariance-based SEM (CB-SEM) (Jannoo et al., 2014). However, Das and Imon (2016) strongly recommend that the assessment of normality assumption is required. Normality can be assessed using three common procedures are; graphic methods, numerical methods, and formula normality tests that Razali and Wah (2011) suggest using both graphic methods and formula normality tests. In this study, the Q-Q plot, Shapiro-Wilk test, and Kurtosis test were employed to examine the normality. Since the residual plot is a better approach to test homoscedasticity rather than variables (Ernst & Albers, 2017), thus the normality of residuals was examined in the study. As a result, the Q-Q plot residuals exhibited that the data point did not follow the pattern of a straight line, as well as the Shapiro-Wilk test showed both residuals had a p-value of less than .05 level of significance (see Table 3), indicating non-normal distribution of the data. Also, the Shapiro-Wilk test result supported the value of Kurtosis which was greater than 2 (2.670/.442 = 6.041) (see Appendix Table A1), indicating that the assumption of normality was rejected (Hinton et al., 2014, p. 106). Nonetheless, Hair et al. (2017) argue that PLS-SEM works well with non-normal data distributions.

Table 3 Tests of normality

	Kolgomorov-Smirnov			Shapiro-Wilk		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
Unstandardized Residual	0.070	118	0.200	0.966	118	0.005
Standardized Residual	0.070	118	0.200	0.966	118	0.005

Assessment of outliers

An outlier can be viewed as a data point that is far outside from the norm of a variable which may impact on statistical analyses (Osborne & Overbay, 2004). Removal of outliers is highly recommended when sample size is small and they are clearly the results of spurious activity (Cousineau & Chartier, 2010). Mahalanobis distance is commonly used for detecting multivariate outliers that outlyingness is based on scores of predictors (Filzmoser, 2004). Mahalanobis distance is evaluated as Chi- Square at $p < .001$ with degrees of freedom equal to numbers of independent variables (Tabachnick & Fidell, 2013, p. 167). Hence, this study adopted Mahalanobis distance to detect the outliers through IBM SPSS 20, found the critical value of Chi-Squares of $p = .001$ for four degrees of freedom was 18.467. Based on the results, two outliers were removed from the study (see Table 4).

Table 4 Detection of influential outliers

Number	Case	Mahalanobis distance
1	55	19.402
2	74	22.929

Common method bias test

Common method bias refers to the degree to which correlations among variables are inflated by the measurement method used in a study (Meade et al., 2007). In fact, there have been increasing debates on common method bias how serious is (Lowry & Gaskin, 2014). Conway and Lance (2010) acclaim that the widespread belief of common method bias causes correlations to be inflated is a myth, whereas MacKenzie and Podsakoff (2012) argue that the issue significantly influences item validity, reliability, and correlations between latent constructs. In addition, Tehseen et al. (2017) opine that when the same respondent is used as a source in obtaining the measures of both independent and dependent variables, the estimated impact may suffer from common method bias if it is not controlled properly through procedural and statistical remedies. However, Schwarz et al. (2017) highly recommend that the common method bias should be reported in any PLS-SEM research study, although disagreement over the issue is widespread. Harman's single-factor test is a common approach used to test common method bias since it is fast and easy to use (Fuller et al., 2015). Tehseen et al. (2017) suggest using Harman's single-factor test to detect the bias rather than control or correct it, although Favero and Bullock (2014) argue the approach should not be used to demonstrate a lack of common method bias in the future. Hence, this study used Harman's single-factor to detect common method bias by loading all items of the constructs into a factor analysis through IBM SPSS 20. The Harman's single-factor test yielded a result of 28.993% of variance explained for the first factor that was lower than the threshold value of 50% (see Table 5). Therefore, the study can be concluded that there was no issue of common method bias to inflate the relationships between the variables.

Table 5 Total variance explained

No.	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	17.686	28.993	28.993	17.686	28.993	28.993

Multicollinearity test

Multicollinearity is when two or more independent variables in the model are highly correlated (Farooq, 2016). It can create logical and statistical problems, inflating the size of error terms, weakening analysis, and rendering instability (Tabachnick & Fidell, 2013). Farooq (2016) elucidates that the main sources of multicollinearity are; low measurement reliability, small sample sizes, and low explained variance in endogenous constructs. The occurrence of multicollinearity can be categorized into; perfect and no multicollinearity, which researchers are expected to always check before fitting the model (Adeboye et al., 2014). Two main techniques in literature to illustrate the presence of strong multicollinearity; variance inflation factor (VIF) and tolerance values. Literature suggests different threshold values of VIF, including; 2.5, 3.3, 4, 5, and 10 (Adeboye et al., 2014; Daoud, 2017; Kock & Lynn, 2012; Marco et al., 2012). Commonly, VIF values are equal to or greater than the threshold, indicating the existence of multicollinearity. In PLS-SEM research, Kock and Lynn (2012) recommend using a VIF threshold of 3.3. Hence, the study adopted the VIF threshold of 3.3 to test the issue of multicollinearity using SmartPLS 3.2.8 software. The results exhibited that VIF values ranged between 1.097 and 2.530, which were considerably less than 3.3 (see Table 6), indicating the existence of multicollinearity was not found in this study.

Table 6 Inner VIF values

	ATF	**EO**	**LO**	**MO**	**PER**
ATF					1.097
EO					2.525
LO					2.308
MO					2.530
PER					

Note: EO = Entrepreneurial Orientation; MO = Market Orientation; LO = Learning Orientation; ATF = Access to Finance; PER = SMEs Performance

Conclusion

In conclusion, this study recapitulated the process of collected data diagnostics before any further multivariate analysis particularly advanced PLS-SEM analysis. The study conducted response rate, missing data analysis, non-response bias test, normality test, assessment of outliers, common method bias test, and multicollinearity test. All the assessments were conducted through IBM SPSS 20, G*Power 3.1, and SmartPLS 3.2.8 software. Therefore, it can be finalized that the data was suitable to be subjected to further multivariate analysis. Importantly, this study contributes significantly enriches the literature by offering insight into the data characteristics of a particular and guiding researchers in conducting data screening and preliminary analysis.

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Appendix

Table A1 Skewness and Kurtosis

			Statistic	**Std. Error**
Unstandardized Residual	Mean		0E-7	0.033
	95% Confidence Interval for Mean	Lower Bound	-0.064	
		Upper Bound	0.064	
	5% Trimmed Mean		0.007	
	Median		-0.025	
	Variance		0.125	
	Std. Deviation		0.354	
	Minimum		-1.468	
	Maximum		1.158	
	Range		2.627	
	Interquartile Range		0.436	
	Skewness		-0.433	0.223
	Kurtosis		2.670	0.442
Standardized Residual	Mean		0E-7	0.090
	95% Confidence Interval for Mean	Lower Bound	-0.179	
		Upper Bound	0.179	
	5% Trimmed Mean		0.020	
	Median		-0.069	
	Variance		0.966	
	Std. Deviation		0.983	
	Minimum		-4.082	
	Maximum		3.220	
	Range		7.302	
	Interquartile Range		1.211	
	Skewness		-0.433	0.223
	Kurtosis		2.670	0.442