IRMM
INTERNATIONAL REVIEW OF MANAGEMENT AND MARKETING
EJ EconJournals
ISSN: 2146-4405

International Review of Management and Marketing

ISSN: 2146-4405

available at http: www.econjournals.com

International Review of Management and Marketing, 2017, 7(2), 197-201.

EJ EconJournals

Small and Medium Enterprises' Risk Modeling

Shahryar Sorooshian[1]*, Nursofea Iman Ahmad Suffian[2]

[1]Faculty of Industrial Management, Universiti Malaysia Pahang, Malaysia, [2]Faculty of Industrial Management, Universiti Malaysia Pahang, Malaysia. *Email: sorooshian@gmail.com

ABSTRACT

Small and medium enterprises (SMEs) in Malaysia keep failing year to year due to economic fluctuation and challenges. This affects the industry and economy growth of Malaysia. This research was conducted to identify criteria of performance prediction model that can predict success or failure risk of SMEs and to develop the predictive model, based on logit regression method, for SMEs of Malaysia. Developing a model of logit regression is by using the four perspectives of the balanced scorecard approach. The four perspectives are independent variables, including the success and failure of SMEs as the dependent variable. The variables would help in developing the model through Statistical Package for the Social Science. data software to gain the binomial regression results. The modeled result is based on the probability of the SME success and bankruptcy risk, useful for policy makers.

Keywords: Risk, Success, Probability, Small and Medium Enterprise
JEL Classification: M1 Business Administration

1. INTRODUCTION

Small and medium enterprises (SMEs) are the opportunity that has been given by the aid of governments to their people to make income through businesses (Sorooshian et al., 2013; Yusra et al., 2015). Enhancing value added to the local commodities and resources and contribute to balanced regional development with opening of SMEs in less developed is one of the ancillary role of SMEs in the industry and technology (Gunto and Alias, 2013). Effectiveness and efficiency of organizations operations and productivity is one of the criteria needed to identify the performance by using performance measurement system (PMS) (Mustafa et al., 2017). PMS owns many tools to measure the successful or the failure of one organizations in terms of productivity, operations, profitability and popularity within customer.

Balanced scorecard is one of the PMS tools (Sorooshian, 2014) that will aid in getting information on what, how, when and why the organization is failing or successful. Balanced scorecard is based on Kaplan and Norton study on the main four perspectives which help in measuring the performance of organizations as for this study is SMEs. Balanced scorecard has four perspectives which are financial perspectives, customer perspectives, internal business perspectives and learning and growth perspectives. These four elements is crucial in every aspect of the company.

Challenges for most of the SMEs is either stable and run their business smoothly or failing due to many kind of barriers and factors. Therefore it is important to every SMEs to execute the system of performance measurement in their business. Despite their significant role in the economy, previous studies have detected various problems faced by SMEs, which affect their profitability and growth where the Malaysian government also feels that SMEs may not be performing as well as they could be Jamil and Mohamed (2011). Hence PMS is applicable to SME to identify their success and failure as it will help other SME to strive in the economy and their own industries.

However even though it is easy to registers as SME company for any kind of industries and businesses the consequences of easy opportunity lead to the increasing of failing SMEs and this give effect to the industries and government. The effect is indirectly to the government but it is directly to the financial support. As the owner of one SME is not success in the business the loan that has been given by the bank will be extended and take time to repay and it will give burden to the owner to pay the loan without any income. Thus it is important to know why and how the SMEs

achieve success and fail to the ground (Aghelie et al., 2016). Comparing Malaysia and Australia percentage of SMEs failure, Malaysia have the highest which is 60% while Australia only 23% (Ahmad and Seet, 2009). Based on the 60% it is worrisome to every party that involve in SMEs development in Malaysia such as the government, financial supports, Malaysia External Trade Development Corporation.

PMS traditionally measures based on management accounting systems which focusing on financial data such as return on investment, prices, sales and profits (Ghalayini and Noble, 1996). From traditional to emerging performance measures which is will be sooner PMS are very different from the traditional. Its includes manufacturing strategy, operational so they can provide managers, supervisors and operators with information required for decision making and improve and monitor regularly (Ghalayini and Noble, 1996; Sorooshian and Dodangeh, 2013).

According to Burgess et al. (2007) there is common understanding has developed in the literature that there exists a traditional approach which relies on financial measures and a more balanced or contemporary approach which depends on a wide range of financial and non-financial measures. The uses of PMS is to ensures the resources are obtained and used efficiently and effectively in accomplishing organizational goals (Burgess et al., 2007).

Kaplan and Norton (Kaplan and Norton, 1992a) mentioned that the balanced scorecard PMS allows managers to look at the business from four important perspectives which derived to four basic questions as below:

1. How do customers see us?
2. What we must excel at?
3. Can we continue to improve and create the value?
4. How do we look to shareholders?

From the perspectives, it is identified that each company or even department have to focus to achieve better performances. So the four concepts have been introduced by Kaplan and Norton in 1992 and explored by much kind of case study and even management principles. The four divergent are:

- The financial – Consist of three element which are growth, profitability and shareholder value (Kaplan and Norton, 1996)
- The customer – Included four elements need to focus and search more in contents of SMEs in Malaysia which are customer retention rate, market share, and customer value and customer relationships
- The internal business - Two elements known as operations perspectives and support perspectives or maintenance perspectives (Alshouf, 2006)
- The learning and growth - To achieve the vision and how they will sustain their ability to change and improve (Isoraite, 2008) by marketing strategy, employee development and internal growth.

2. RESEARCH METHODOLOGY

This research focuses on quantitative methods and Logistic regression method on Social Science Software (Statistical Package for the Social Science [SPSS]) is chosen for data analysis. As this research logistic regression analysis, researchers mainly focus on binary or binomial logistic regression.

Binomial logistic regression as known as simply logit regression is a method that used to define a phenomenon that represented by a feedback variable Y using a series or independent of explanatory variables (Nicolis and Tondini, 2006). This research we will use dichotomous response variable Y where it represents binary model its either 0 = Failure/bankruptcy and 1 = Success. Based on Nicolis and Tondini on their research 2006 they explained that Let p(x) represent the probability of success when the random variable Y is 1.

In general the logistic regression model is given in equation 1.

$$P = \frac{\exp[a + b(X) + c(Y) + \ldots + n(Z)]}{1 + [\exp[a + b(X) + c(Y) + \ldots + n(Z)]]} \quad (1)$$

In this research stratified sampling is used where it means the population is divided into groups according to some characteristics that are important to the study and then the sample is selected from each group by a Snowball sampling. In short the stratified sampling is the most suitable for this research because researchers could choose sample based on the characteristics that are needed for successful and failed SMEs.

On the other hand, as the independent variables of this study is four variables while the dependent variables is two it is an information to identify how many sample that this research will be needing to ensure it achieve the objectives. Based on the thorough research, the most suitable model or tool to identify the number of sample to be the respondents for logit regression of this research is as shown in equation 2 (Peduzzi et al., 1996).

$$N = 10\ k/p \quad (2)$$

Where, k is the number of independent variables which is the variables of balanced scorecard where p is the smallest of the proportions of negative or positive cases in the population that the negative is the failing SME, or in general bankrupted SME, while the success SMEs it the positive. Furthermore in this research, it is assumed that both failing and success SME is 50%. Hence the respondents needed is N = 80 respondents both success and fail SMEs.

Based on the balanced scorecard approach, there 4 perspectives which are financial, customer, internal business and learning and growth. These 4 perspectives have 14 items and each have 3-4 questions based on their contents. In financial and internal business both have 3 questions based on the description and contents in balanced scorecard approach. On the other hand for customer and learning and growth contain 4 questions each perspectives.

Binomial regression works by using two variable, independent and dependent variables whereas the dependent variable is the successful and failed SMEs. As in the previous literature, successful SME definition for this research is 5 years involvement in industry without bankruptcy and a failed SME is a bankrupt

SME. The distribution of questionnaires started July 2016 until October 2016 and managed to get 80 respondents from SME background; 40 successful SME and 40 failed SME for the requirements to create model by using logit regressions models. Cronbach's alpha was uses as a measurement of the internal consistency of the collected data (Tavakol and Dennick, 2011).

3. DATA ANALYSES

Demographical result is an important characterization strategy for entreprenurs inorder to manage their SME (Sorooshian et al., 2011; Sorooshian et al., 2012). For this study authors chose gender, age, and highest academic qualification (HAQ).

Table 1 shows that female gender is higher two respondent from male. Although there are slightly different for both male and female but it did not prove that female is more success in SME industry than the male. Thus, as shown in Table 2, it is significant to know the frequencies between the success and failure.

Next demographical is age which in this study, there are three group of age. The age group started with 18-28 years old, 29-39 years old and lastly 40 and above, as shown in Table 3.

The age group, Table 4, shows that age group of 18-28 years old and 40 and above are the age group that significantly high in involving themselves in SME industry.

Age group also can be the factors of the performance or the successfulness of one industry. As shown in Table 4, the age group that hold the higher position in maintaining and keep success in their company is 40 and above while for the failure is the age group of 18 until 28 years old. The experiences and also skills are needed to have a success company which is proven that the older age group can still maintain their performance of SME.

The next demographical analysis, Table 5, is HAQ. HAQ is very important as to identify is either the company that have been developed and manage have a highest academic background or have at least certification.

As Table 5 shown that have degree academic background is the highest respondent. However it does not proved that degree holder is the key to have a success of SMEs. Thus Table 6 are the results between success and failure of SME based on academic background.

As shown from the result, alpha Cronbach for all perspectives is in range of more than 0.60. This is proved that the questionnaires that have been distributed are reliable. In gaining logit regression numbers and figures, it is crucial to make all questions in average based on the each respondents for each perspectives. The average eventually will be the independent variables where known as the 4 perspectives of balanced scorecard.

Figuring out the model, in SPSS the dependent variable is the success and failure as in this research it categorized as success is 1 while failure is 0. Each perspective has their results as shown for

Table 1: Gender frequencies and percentage

Gender	Frequency (respondent)	Percentage
Male	39	48.8
Female	41	51.2

Table 2: Gender frequencies and percentage differentiation by success and failure in SMEs

Gender/success or failure	Success		Failure	
	Male	Female	Male	Female
Frequencies (person)	25	15	14	26
Percentage (%)	62.5	37.5	35	65
Total	80			

SME: Small and medium enterprises

Table 3: Age group

Age	Frequency (%)	Valid percent
18-28 years old	37 (46.2)	46.2
29-39 years old	11 (13.8)	13.8
40 and above	32 (40.0)	40.0
Total	80 (100.0)	100.0

Table 4: Age group differentiation between success and failure in SME industries

Age group	Frequency (%)	
	Success	Failure
18-28 years	12 (30)	25 (62.5)
29-39 years	7 (17.5)	4 (10.0)
40 and above	21 (52.5)	11 (27.5)
Total	40 (100)	40 (100)
Total	80	

SME: Small and medium enterprises

Table 5: Highest academic qualification demographical analyses

Academic qualification	Frequency (%)
SPM	20 (25.0)
STPM	9 (11.2)
Diploma	16 (20.0)
Degree	30 (37.5)
Master	4 (5.0)
PhD	1 (1.2)
Total	80 (100.0)

Table 6: Differentiation of highest academic qualifications group in demographical analyses

Academic qualifications	Frequency (%)	
	Success	Failure
SPM	7 (17.5)	13 (32.5)
STPM	5 (12.5)	4 (10.0)
Diploma	9 (22.5)	7 (17.5)
Degree	15 (37.5)	15 (37.5)
Master	3 (7.5)	1 (2.5)
PhD	1 (2.5)	0 (0)
Total	40 (100.0)	40 (100)

IV1 which is financial perspectives where the result of regression is −0.472. On the other hand for customer perspectives in IV2 shown in the table is 0.206. Independent variables number three which is for internal business perspectives of balanced scorecard data

collected for regression is 0.688. Internal business perspectives got the highest in regression analyses; while for independent variables four where the average for learning and growth perspectives is −0.233.

All independent variables in regression analyses will be put in logit regression formula 1 to be the model of predictions for the successful of SMEs. Therefore, the bankruptcy prediction model will be using the regression analyses as shown equation 3.

$$P = \frac{\exp[-0.472\,(\text{Financial}) + 0.206\,(\text{Customer}) + 0.688\,(\text{Internal Business}) - 0.233\,(\text{Learning and Growth})]}{1+[\exp(-0.472\,(\text{Financial}) + 0.206\,(\text{Customer}) + 0.688\,(\text{Internal Business}) - 0.233\,(\text{Learning and Growth}))]} \quad (3)$$

From Equation 3, 1−P is the bankruptcy risk. Feasibility test for the model is to identify either the model is valid and can apply in SME or any other industries. Therefore to ensure the test is valid, it is important to use the same questionnaire that have been distributed to the one who work at SME also. Deploy the questionnaire to a random respondent. The collected data is shown in Table 7.

Based on the Table 7, to test the feasible of model it started to insert all the average into the formula shown in equation 4.

$$P = \frac{\exp[-0.472\,(4) + 0.206\,(4.5) + 0.688\,(4) - 0.233\,(4.25)]}{1+[\exp(-0.472\,(4) + 0.206\,(4.5) + 0.688\,(4) - 0.233\,(4.25))]} \quad (4)$$

Above equation 4 results is the logistic regression model solutions based on the collected data from the respondent that have been used to find the solution. The solution for logit regression model is also known as probabilities of success. P shown in the equation 4 is the probability. Probability of success based on the completion of logit regression model is 0.685 as in probability ratio it is 68%, which shows the respondent will succeed to manage an SME, while another 32% to fail or bankruptcy in the industry.

Table 7: The average of SME respondent for feasibility test

Balanced scorecard approach	Average of items	Items	Questions
Financial perspectives	4.00	3	Q1
			Q2
			Q3
Customer perspectives	4.50	4	Q4
			Q5
			Q6
			Q7
Internal business	4.00	3	Q8
			Q9
			Q10
Learning and growth	4.25	4	Q11
			Q12
			Q13
			Q14

SME: Small and medium enterprises

4. CONCLUSION

Research is always a friend to everyone here in earth. It begins with curiosity and questioning. Curiosity and questioning can end up with research and results. This terms is always work with students and researcher to identify their curiosity and "whys." Therefore it is important to have such research even a small and mere research as long as it give benefit to others. In short, the model of logit regression in this research provide all SMEs and even other organizations that support SMEs industry a better way to avoid bankruptcy and expect high in succession of SMEs. In future maybe there will be lots of SMEs that survive with this research outcome.

This research has a wide scope which is the whole Malaysia and citizen who involve with SMEs directly. However due to the time and cost, it is impossible to gain and follow the sample size, which further studies may to try to generalize this research finding with more data and case testing using this research final model.

REFERENCES

Aghelie, A., Sorooshian, S., Noor Azlinna, A. (2016), Research gap in sustainopreneurship, Indian Journal of Science and Technology, 9(12), 1-6.

Ahmad, N.H., Seet, P.S. (2009), Dissecting behaviours associated with business failure: A qualitative study of SME owners in Malaysia and Australia. Asian Social Science, 5(9), 1-7.

Alshouf, I. (2006), Measuring maintenance performance using a balanced scorecard approach. Journal of Quality in Maintenance Engineering, 12(2), 133-149.

Burgess, T.F., Ong, T.S., Shaw, N.E. (2007), Traditional or contemporary? The prevalence of performance measurement system types. International Journal of Productivity and Performance Management, 56(7), 583-602.

Ghalayini, A.M., Noble, J.S. (1996), The changing basis of performance measurement. International Journal of Operations and Production Management, 16(8), 63-80.

Gunto, M., Alias, P.D.D. (2013), SMEs Development in Malaysia: Lessons for Libya. Prosiding Perkem, 5(3), 1521-1530.

Isoraite, M. (2008), The balanced scorecard method: From theory to practice. Intellectual Economics, 3(1), 18-28.

Jamil, C.M., Mohamed, R. (2011), Performance measurement system (PMS) in small medium enterprises (SMES): A practical modified framework. World Journal of Social Sciences, 1(3), 200-212.

Kaplan, R.S., Norton, D.P. (1992), The balanced scorecard- measures that drive performance. Harvard Business Review, 70, 71-79.

Kaplan, R.S., Norton, D.P. (1996), The Balanced Scorecard: Translating Strategy into Action. Boston: Harvard Business School Press.

Mustafa, N.M., Sorooshian, S., Azizan, N.A. (2017), Performance Measures for Developing the Performance Measurement System: Systematic literature review approach Quality-Access to Success, 18(156), 57-64.

Nicolis, O., Tondini, G. (2006), Logit models for analysing and forecasting the performance of industrial enterprises in the Treviso area. Managerial Finance, 32(8), 654-672.

Peduzzi, P., Concato, J., Kemper, E., Holford, T., Feinstein, A. (1996),

A simulation study of the number of events per variable in logistic regression analysis. Journal of Clinical Epidemiology, 48, 1373-1379.

Sorooshian, S. (2014), Study on unbalanceness of the balanced scorecard. Applied Mathematical Sciences, 8(84), 4163-4169.

Sorooshian, S., Anvari, A., Salimi, M., Faltoonitoosi, E. (2012), Interrelation study of entrepreneur's capability. World Applies Sciences Journal, 17(7), 818-820.

Sorooshian, S., Choo, W.O., Chue, W.Y. (2013), Highlights of a gap in SME studies. International Business Management, 7(3), 140-141.

Sorooshian, S., Dodangeh, J. (2013), A moderated practice for strategy implementation analysis. American Journal of Applied Sciences, 10(9), 1039-1042.

Sorooshian, S., Norzima, Z., Yusof, I. (2011), Descriptive comparison of SME performance between Iran and UK. World Applies Sciences Journal, 15(2), 452-455.

Tavakol, M., Dennick, R. (2011), Making sense of Cronbach's alpha. International Journal of Medical Education, 2(2042-6372), 53-55.

Yusra, Y.L., Azlinna, A., Sorooshian, S. (2015), How are the performance of small businesses influenced by HRM practices and governmental support? Mediterranean Journal of Social Sciences, 6(1), 97-108.