SMEs FAILURE PREDICTION: LITERATURE REVIEW

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บทความนี้มีวัตถุประสงค์เพื่อทบทวนวรรณกรรมเกี่ยวกับงานวิจัยเชิงประจักษ์ในการทำนายความล้มเหลวของธุรกิจขนาดกลางและขนาดย่อม โดยมุ่งพิจารณาที่เครื่องมือที่ใช้ในการวิเคราะห์และปัจจัยที่สัมพันธ์กับภาวะความล้มเหลวดังกล่าว ในประเทศกำลังพัฒนานั้นธุรกิจขนาดกลางและขนาดย่อมถือว่าเป็นธุรกิจที่มีความสำคัญยิ่งในการเป็นแหล่งจ้างงาน รัฐบาลของประเทศต่าง ๆ พยายามกระตุ้นการเติบโตของเศรษฐกิจของประเทศโดยเน้นไปที่การพัฒนาธุรกิจขนาดเล็กเหล่านี้ สำหรับประเทศไทยก็เช่นเดียวกัน ธุรกิจขนาดกลางและขนาดย่อมก็มีบทบาทสำคัญยิ่งในการเป็นแหล่งผลิตสินค้าใหม่ ๆ และเป็นแหล่งการจ้างงาน แต่กลับพบว่าธุรกิจเหล่านั้นยังเผชิญปัญหาต่าง ๆ ในการประกอบการ โดยเฉพาะอย่างยิ่งปัญหาในการจัดหาเงินทุน ความยากในการเข้าถึงเงินทุนและต้นทุนในการจัดหาเงินทุนที่สูงส่งผลให้ธุรกิจเหล่านั้นประสบความล้มเหลวซึ่งจะยังผลให้เกิดต้นทุนหรือความสูญเสียต่าง ๆ ตามมา อาทิ ความสูญเสียทางเศรษฐกิจ ทางการเงิน และทางสังคม ดังนั้นการพัฒนาเครื่องมือที่สามารถทำนายภาวะความล้มเหลวดังกล่าว จึงเป็นเรื่องที่มีความสำคัญมาก งานวิจัยที่ทำการศึกษาในประเด็นนี้ เช่น Keasey and Watson (1987), Laitinen (1992), Wagner (1994), Huyghebaert and Gaeremynck (2000), Watson (2003), Bilderbeek and Pompe (2005), April (2005), Altman and Sabato (2007) และ Fantazzini and Figini (2009b) และนับเป็นเรื่องที่น่าสนใจเป็นอย่างยิ่งที่การศึกษาที่ผ่านมายังไม่มีกรณีของประเทศไทยเลย

Abstract

The main purpose of this paper is to review the literature on the empirical methodologies utilized in bankruptcy prediction and the potential predictors of organization failure by emphasis in Small and medium enterprises (SMEs). In developing countries, small-scale businesses are the most important source of new employment opportunities. Governments throughout the world attempt to promote economic progress by focusing on small-scale enterprises. Despite the fact that SMEs play an increasingly important role in providing new products and employment opportunities, SMEs in Thailand have encountered many difficulties, especially financing. SMEs frequently lack access to institutional credit, causing them to encounter high

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financing costs and facing failure. The economic, financial, and social losses resulting from these failures are significant. Thus, it is valuable to try to develop methods to predict such failures. However, there are only very few studies dealing with failure prediction methods for SMEs compared to those that focus on listed companies context. The studies examined SMEs failure or survival such as Keasey and Watson (1987), Laitinen (1992), Wagner (1994), Huyghebaert and Gaeremynck (2000), Watson (2003), Bilderbeek and Pompe (2005), April (2005), Altman and Sabato (2007) and Fantazzini and Figini (2009b). It is important to note that the studies mentioned earlier were not conducted for the case of Thailand.

INTRODUCTION

Small and medium enterprises (SMEs) play an important role in a nation's economy. They make substantial contributions to employment and comprise the majority of businesses in the nation (Burns & Dewhurst, 1996; Bushong, 1995; Holmes, 2003). In developing countries, small-scale businesses are the most important source of new employment opportunities. Governments throughout the world attempt to promote economic progress by focusing on small-scale enterprises (Harper & Soon, 1979). There are two fundamental characteristics of small businesses which separate SMEs from the public. The first one is their smallness and the second one is their rate of turnover and failure rate (Peacock, 2000).

According to the Office of Small and Medium Enterprises Promotion (OSMEP, 2006), during 2003-2006, the ratio of SMEs Gross Domestic Product (GDP) to overall GDP was rather steady at approximately 39 percent with the growth rate moved in the range of 4.1 to 4.8 percent. The exceptional growth rate is 7.6 percent in 2004. Although SMEs contribute to the economy growth less than half of total GDP in national level, SMEs is important economy sector as the number of SMEs is more than 99 percent of the total number of enterprises in Thailand and play a significant role in employment and growth distribution to the area outside Bangkok metropolitance. Specifically, their contribution to employment was at 76.7 percent of total employment rate with approximately 70 percent of their businesses located outside Bangkok metropolitance area.

Even though SMEs play an increasingly important role in providing new products and employment opportunities, SMEs in Thailand have encountered many difficulties, especially financing. SMEs frequently lack access to institutional credit (World Bank, 1978), causing them to encounter high financing costs and facing failure situation (Byron & Friedlob, 1984; DiPietro & Sawhney, 1977; Fredland & Morris, 1976).

When company entered into financial distress or failure, the significant costs including direct and indirect cost have occurred (Altman & Hotchkiss, 2006). The impact of such events on owners, shareholders, managers, employees, lenders, suppliers, clients, the community and the government is horrendous. The failure of business unit causes significant direct and indirect costs especially to SMEs which are the business units that play significant roles in the economy. The model that could be used as an early warning signal of failure is essential. Previous literatures have employed various methodologies using various catego-

ries of variables in predicting or examining bankruptcy of failure. The main purpose of this paper is to review the literature on the empirical methodologies utilized in bankruptcy prediction and the potential predictors of organization failure.

The paper is divided into six sections starting with the introduction. The following section presents the SMEs role in the Thai economy. Section 3 provides the failure rate of SMEs. The literature review in previous SMEs failure or survival prediction will be discussed in Section 4. Section 5 discusses the potential factors of SMEs survival probability. The extensive review of financial ratios and its popularity will also be presented in this section. Finally, Section 6 provides the conclusions.

ROLES OF SMEs IN THE THAI ECONOMY

Thai economy measured by Gross Domestic Product (GDP) grew by 2.6 percent in 2008, a 2.2 percent decrease when compared to the 4.8 percent growth in 2007. GDP for 2008 was 9,104,959 million baht, more than 655,759 million baht compared to 2007. GDP classified by sector showed that in 2008, the agriculture sector plays a significant role in Thai economy, as it accounts for 1,053,908.0 million baht or 11.6 percent of the overall GDP while non-agriculture sector was calculated at 8,048,877 million baht or 88.4 percent of the overall GDP (Office of Small and Medium Enterprises Promotion, 2008c).

Furthermore, the contribution to GDP by SMEs was 3,446,589.2 million baht or 37.9 percent of the overall GDP. The amount was a mild decrease compared to 2007 but it still represented a growth rate of 1.9%. More specifically, classifying the GDP by size, the paper found that GDP for SE and ME were 2,295,711.5 and 1,150,877.7 million baht, respectively. GDP by SE account for 25.2 percent of the overall GDP or 1.7 percent expansion from 2007 while GDP by ME contribute 12.6 percent of whole economy which was 2.3 percent expansion compared to previous year Office of Small and Medium Enterprises Promotion. When considering the overall SMEs GDP structure, distributed by economic activity in 2008, there is the evidence that production sector had the most important economic activity while the second and third most important sector were services and trade and repairs sector, respectively (Office of Small and Medium Enterprises Promotion, 2008b).

During 2005-2008, it is found that contribution of GDP by SMEs in the nation economy showed a downward trend which approximate 39.6, 38.9, 38.2 and 37.9 percent of the overall GDP, respectively. It should be noted that although the contribution to GDP by SMEs less than half of the overall GDP, SMEs were important in terms of job creation and growth distribution in regions. More specifically, the number of SMEs was 99 percent of the national total and their contribution to employment was at 76.7 percent of all jobs with 70 percent of their business located in different regions (Office of Small and Medium Enterprises Promotion, 2008a).

Regarding the contribution of SMEs to GDP classified by regions, in 2008 the most important region was Bangkok and vicinity with GDP reached 1,535,963.4 million baht or 45.4 percent of the overall GDP. The second most important region was eastern region with 464,160.2 billion baht or 13.7 percent of the nation GDP. For the Northeastern Re-

gion, it is rank the third most important region in contribution of the overall GDP. Particularly, the GDP by SMEs located in the Northeastern Region was 419,475.7 million baht or 12.4 percent of the overall GDP (Office of Small and Medium Enterprises Promotion, 2008c).

In addition, when focusing the GDP by SMEs located in the Northeastern Region classified by economic activity it is found that, in 2008, the trade and repairs sector was the most important sector in economic activity with GDP stood at 189,463.4 million baht or 45.2 percent of the nation GDP. Followed by the production sector with GDP approximate 75,855.9 million baht or 18.1 percent of the overall economy (Office of Small and Medium Enterprises Promotion, 2008c).

According to Office of Small and Medium Enterprises Promotion (2008a), in 2006, the employment of all enterprises was 11,551,272. The number can be classified by enterprise size as follows: 2,687,938 positions in LE or 23.3 percent of the overall employment, followed by 1,338,398 in ME or 11.6 percent and 7,524,936 in SE or 65.1 percent. Accordingly, the job creation by the SMEs was 8,863,334 or 76.7 percent of all positions. This figure compared to SMEs job offered between 2004 and 2006, shows an increase in 2006 of 3.9 percent compared to 2005 due mostly to the increase in the SE, which grew by 6.3 percent.

In addition, SMEs employment classified by sector in 2006 was concentrated most in the production sector for 3,496,202 positions or 39.4 percent, a 1.1 percent rise from the previous year. The service sector was the second largest group of employers at 2,923,338 positions or 33 percent, a 10.8 percent surge from 2005. Third was trade and repairs, employing 2,443,414 or 27.6 percent, a 3.6 percent increase.

Furthermore, the number and proportion of employment in SMEs in 2006 classified by business area was as follows: in Bangkok metropolis and vicinity, the total number of workers employed by SMEs was 4,504,931 or 50.8 percent of countrywide SMEs employment. The paper found that in the Northeastern Region, SMEs workers totaled 1,358,426 or 15.3 percent which is rank in the second order after Bangkok metropolis and vicinity. This emphasizes the importance of focusing the research on SMEs located in the Northeastern Region. The third rank regarding the number of employment by SMEs was the northern region with the number of SMEs workers around 979,614 or 11.1 percent. In the eastern, southern, central and western region had the SMEs workers numbered 711,591 or 8 percent, 601,413 or 6.8 percent, 377,537 or 4.3 percent and 328,104 or 3.7 percent, respectively.

FAILURE RATE OF SMEs

With the impacts of financial crisis, many large corporations and public sector organizations reduce their staff members. Therefore many aspiring entrepreneurs suddenly find themselves out of work and cannot continue the operations. Most of such businesses are SMEs (Jones, 2009).

In the United States, according to Mason (2009), the Small Business Administration keeps the statistics on business failures and claims that more than half of new businesses will disappear in the first five years, furthermore, the statistics show that 8 out of 10 new businesses fail within the first three years.

In Australia, there exist limited informa-

tion regarding the liquidation of small companies, furthermore, there are no official long-term statistics regarding the entrance and exit rates of small business. There is a high failure rate of small business in Australia although there are various meanings of failure and disagreement on the actual rate. In the first year nearly one third of all start ups failed on the average. The proportion of failures then declined for each subsequent year but the cumulative failure rates are high at 62 percent after three years and 74 percent after five years. In other words, no more than about one quarter of enterprises have survived five years (Peacock, 2000).

In case of Thailand, the number of SMEs that entered failure and the relevant failure rate are as following tables.

According to Table 1 and 2, it has been found that the highest failure rate of SMEs in Thailand during 2002-2007 based on the registration year are at the second and the third year after the registration and then the failure rate have been continuously decreased afterwards. More specifically, the failure rate is approximately 3.3 percent at the first year after the registration and then the rate is increase to 4.8 percent at two years after registered

Table 1: The Number of Failed SMEs During 2002-2007

Registration Year	Number of Operating Years						
	<= 1 Year	> 1-2 Year	> 2-3 Year	> 3-4 Year	> 4-5 Year	> 5-6 Year	> 7 Year
2002	991	1,676	1,685	1,461	1,192	1,069	1,293
2003	1,498	2,498	2,319	1,687	1,518	1,656	-
2004	1,657	2,312	2,016	1,841	1,460	-	-
2005	1,789	2,211	2,141	1,691	-	-	-
2006	1,543	2,175	1,826	-	-	-	-
2007	1,317	1,597	-	-	-	-	-

Source: Office of Small and Medium Enterprises Promotion (2008c)

Table 2: The Failure Rate SMEs During 2002-2007

Registration Year	Number of Operating Years						
	<= 1 Year	> 1-2 Year	> 2-3 Year	> 3-4 Year	> 4-5 Year	> 5-6 Year	> 7 Year
2002	2.8	4.7	4.7	4.1	3.3	3.0	3.6
2003	3.4	5.7	5.3	3.8	3.5	3.8	-
2004	3.8	5.3	4.6	4.2	3.3	-	-
2005	3.6	4.5	4.3	3.4	-	-	-
2006	3.3	4.6	3.9	-	-	-	-
2007	3.2	3.9	-	-	-	-	-
Average	3.3	4.8	3.8	2.6	1.7	1.1	0.6

Source: Office of Small and Medium Enterprises Promotion (2008c)
Note: The failure rate is computed from the number of failed SMEs in each year divided by the number of registered SMEs in the corresponding year.

and continuously increase in the third year after the operation with 3.8 percent. Although the failure of an individual SMEs will never attract the media attention which follows the collapse of an Enron or a Parmalat, the consequences of the failure of smaller companies are certainly a serious matter for those stakeholders who are directly involved (The European Federation of Accountants, 2004).

PREVIOUS LITERATURE ON SMEs SURVIVAL OR FAILURE

There are previous studies that focused on examining SMEs survival or failure. For example, Peacock (2000) studies the rate of failure of small firms in Australia. The study has indicated that there is a high failure rate of small business in Australia despite the fact that there exist various meanings of failure e.g. legal failure, discontinuance of small business and failure to 'make a go of it'. In addition, the paper discussed that the basic problems of small businesses include the owner is the business, isolation, lack of information, lack of time, pressure, product dedication, external changes are critical, small businesses are seldom in equilibrium or even near it and high business risk. Furthermore, the study pointed that the root cause of failure is management inefficiency and particularly inefficient financial management and poor accounting. The study results are consistent with Said and Hughey (1977) which focused on examining managerial problems of the small firm. The study examined five problems areas relating the lack of managerial ability in small firms include cash management, personnel, record-keeping, merchandising and tax planning problems. Furthermore, the findings from a survey by Peterson, Kozmetsky and Ridgway (1983) confirmed similar conclusion that the major cause of small business failures was a lack of management expertise. Consequently, the survey's participants suggested that the solution for decreasing small business failures was to improve management education.

In Europe, the European Federation of Accountants (2004) examined the internal and external causes of SMEs failure in Europe and explored the effects of failure for the business and its stakeholders. Then, the study provided practical guidance to entrepreneurs of SMEs by analyzing the most appropriate preventive measures to avoid business failure. The results discussed that the internal causes of business failure include poor management, deficit in accounting, poor cash flow management, inappropriate sources of finance, dependency on customers or suppliers, impending bad debt, overtrading, poor marketing and research, fraud/collusion. In addition, the external causes of business failure consist of economy, catastrophic unpredictable events, governmental measures and international developments, environmental protection and other regulatory requirements, bankruptcy of main customer or supplier.

Some researcher e.g. Masurel and van Montfort (2006) and Jones (2009) focused on the SME's life cycle as a step for success or failure. According to Masurel and van Montfort (2006), the results based on professional services firms clearly revealed that firms change over the course of their life cycles. During the first three stages, diversification in sales, the differentiation in labor force, and the level of labor productivity increase. In the last stage, diversification in sales, the differentiation in labor force, and the level of labor productivity decrease. Consistent to Jones

(2009) which argued that all SMEs seem to go through different life cycles and SMES must mange along the way in order to survive and prosper and be ready for the next growth phase.

Previous literatures have been explored SMEs survival or failure in various countries using various empirical methodologies e.g. Keasey (1987), Laitinen (1992), Wagner (1994), Huyghebaert and Gaeremynck (2000), Watson (2003), Bilderbeek and Pompe (2005), April (2005) and Altman and Sabato (2007). The summary of these studies are reported in Table 12 below. Furthermore, some studies compared different methodologies in predicting failure e.g. Fantazzini and Figini (2009b) and Fantazzini and Figini (2009a). Particularly, Fantazzini and Figini (2009a) discussed and compared the classical longitutional models, pooled logit models and the Bayesian models in predicting the SMEs default probability Germany The results found that Bayesian models perform much better than the classical longitudinal and pooled logit models.

It should be noted that there are no studies explore SMEs survival or failure in Thai context. Most of studies examined the failure or financial distress in the context of listed companies rather than SMEs e.g. Person (1999), Tirapat and Nittayagasetwat (1999) Graham, King and Bailes (2000) and Yammeesri (2003).

POTENTIAL FACTORS OF SMEs SURVIVAL PROBABILITY

As discussed before, the previous studies that examine the likelihood of bankruptcy or failure mostly focus on the listed companies rather than SMEs context. Therefore, the paper will present and discuss the potential factors for SMEs failure or survival based on listed companies context. However, this study realizes that there are some different aspects between the small and medium firms and well-established firms by including the control variable such as the organization size in the analysis in addition to the main independent variables which are financial ratios.

1. Financial Ratios Variables

Researchers argue that it can be expected that the symptoms of financial distress are observable from the deterioration of financial ratios. A considerable body of literature emphasizes the importance of developing skills in reading and interpreting historical financial statements to monitor financial health and progress (McMahon & Davies, 1994)

Various studies in the literature, for example, Beaver (1966), Altman (1968a), Routledge and Gadenne (2000) and Rommer (2005), incorporated financial ratios in predicting bankruptcy or financial failure and confirmed that financial ratios are the significant indicators of corporate failure. However, there is inconclusive evidence regarding the significant financial ratios since each study reported different financial ratios as the significant indicators of financial distress.

As a result of the lack of an established theory in guiding the possible financial ratios for inclusion in corporate failure prediction models (Ball et al., 1982; Gilbert, Menon and Schwartz, 1990), researchers have been employed in data fitting exercises. Previous studies initially consider large sets of independent variables and then use statistical techniques to

obtain the selected variables in the final model. For example, Altman reduced the original twenty-two variables to five by searching through various discriminant functions to obtain the one that predicted best. Another approach is employing the variables suggested by the existing literature or those found to be significant by previous corporate failure or financial distress studies.

The use of financial statement information for corporate bankruptcy prediction has been extensively explored by researchers. As discussed by Lincoln (1984), analysts should rely on financial statements in examining corporate financial failure because all the factors influencing the success of a company are reflected in its financial statements. Poor management will be reflected in the profit and loss statement, economic downturns will be shown in the company's declining cash flow and tight credit or low levels of money supply growth will be reflected in the balance sheet. Four categories of financial ratios, that is, profitability, liquidity, debt management and assets management ratios, are usually utilized in previous studies as discussed in the following sections.

Profitability ratios measure the ability of a company to generate earnings. The more earnings a company can generate, the greater the increase in funds and liquidity. Many firms face financial distress when they have negative earnings (Khunthong, 1997). Therefore, it is expected that a high profitability company is less likely to face financial distress.

Liquidity ratios measure a company's ability to pay off its short term debt obligations. This is done by comparing a company's liquid assets to its short term liabilities. In general, the greater the proportion of liquid assets to short term liabilities the better, as it is a clear signal that a company can pay the debts that are coming due in the near future and still fund its ongoing operations. On the other hand, a company with a low coverage rate should raise a red flag for investors, as it may be a sign that the company will have difficulty meeting its running operations, as well as meeting its obligations. Most firms face financial difficulties after suffering illiquidity problems (Khunthong, 1997).

Debt Management ratios measure the long term solvency of a company. The analysis of financial leverage is concerned with the capital structure of the firm. These ratios show the origin of funds provided from external sources to the benefit of the shareholders. The ratios have been used to examine a company's ability to pay long term liabilities (Khunthong, 1997). The expectation is that a company with high financial leverage is more likely to enter financial distress.

Asset Management ratios measure the ability of a company to utilize its assets to generate revenues or returns (Khunthong, 1997). A company with high efficiency in assets utilization is expected to earn more revenues and net incomes. Consequently, the company is less likely to face financial difficulties.

2. SMEs Specific Variables

In addition to financial ratios, previous studies employed SMEs specific variables in the model include SMEs size and SMEs location. The details of these variables are discussed as follows.

To examine the effect of company size on bankruptcy or financial distress, researchers measure company size in various ways, for example, total assets (Lamberto & Rath, 2008), the logarithm of total assets (Gestel et al., 2006; Lensberg, Eilifsen, & McKee,

2004; Lizal, 2002; Parker, Peters, & Turetsky, 2002; Rommer, 2004, 2005), the natural logarithm of total assets (Hensher, Jones, & Greene, 2007), the logarithm of sales (Laitinen, 1992), the natural logarithm of sales (Chen & Lee, 1993; Hill, Perry, & Andes, 1996) and the number of employees (Audretsch & Lehmann, 2004; Audretsch & Mahmood, 1995; Kauffman & Wang, 2007; Lennox, 1999).

Previous literature confirms the significance of company size in explaining corporate failure; however, the results are mixed. On the one hand, it is expected that a small company is more likely to fail because of inadequate experience in the market, limited connections and limited financial resources compared to a larger company (Audretsch & Mahmood, 1995; Honjo, 2000). Previous studies confirm the negative relationship between firm size and the likelihood of corporate financial distress, for example, Altman, Haldeman and Narayanan (1977), Ohlson (1980), Audretsch and Mahmood (1995), Lennox (1999), Nikitin (2003), Lensberg, Eilifsen and McKee (2004) and Hensher, Jones and Greene (2007).

On the other hand, some previous studies, for example, Laitinen (1992), Parker, Peters and Turetsky (2002), Lamberto and Rath (2008) have found that corporate size is positively related to the likelihood of financial distress.

It should be noted that some of the previous studies have not found that company size is significantly related to the likelihood of financial distress; for example, Turetsky and McEwen (2001) examined the relationship between firm size and financial distress and the results showed that size is not significant. This is consistent with Yu (2006), which found that a credit cooperative's size, in terms of total assets relative to those of the local market, did not have a significant effect on the bankruptcy hazard.

Regarding the company location, it is expected that failure is more likely in high per capita income, rapidly growing areas. Apparently, firms are more likely to enter business in growing, high income areas. Since new firms are more likely to fail than older ones, failure rates are higher in economically expanding areas, in spite of strong demand (Fredland & Morris, 1976).

CONCLUSIONS

This paper has described the situation of SMEs in Thailand and its role on the nation economy. It can be seen that SMEs were important parts in overall economy in terms of job creation and growth distribution in regions. The number of SMEs was 99 percent of the national total and their contribution to employment was at 76.7 percent of all jobs with 70 percent of their business located in different regions. This paper also provided the statistics about the failure rate of SMEs in Thailand and presented some issues relating the failure rate from previous literature. Furthermore, the paper has also reviewed and briefly discussed previous literature examining SMEs survival or failure in various countries e.g. Germany, Namibia, U.S.A., England and etc. using various research methodologies such as logistic regression, multivariate discriminant analysis, neural network, survival analysis and etc. These studies have been conducted both within the qualitative and quantitative framework.

It can be seen that previous studies have been using various empirical methodologies in exploring the issue regarding SMEs survival

or failure. However, in Thailand, there are no empirical studies that examine the SMEs survival or failure despite the fact that SMEs were important parts in overall economy in terms of job generation and growth distribution in regions. Therefore, this paper implies that the issue still deserves further attention from researchers and academicians.

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