



A Review Paper on Risk Management of Start-up Business for Small Medium Entrepreneurs (SMEs)

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ABSTRACT

Nowadays, SMEs plays a vital role in economic growth in Malaysia because it is the largest category of business in Malaysia. Therefore, many Malaysians, especially young generations, are involved in this area as they believe that entrepreneurship can help them improve their living standard and income level. Besides, the government support become one of the factors why young Malaysian people want to be an entrepreneur. However, many successful entrepreneurs in Malaysia struggled to survive because of some risks and challenges that they need to face. Therefore, this paper aims to study previous papers regarding the importance of risk management in start-up businesses. This paper found that protection of insurance/takaful and mathematical risk index is an essential tool that can help the entrepreneur manage and measure the risk in entrepreneurship.

Keywords: Risk Management, Start-up Business, Small and Medium Enterprises (SMEs)

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INTRODUCTION

Nowadays, Small and Medium Enterprises (SMEs) becomes a hot issue especially in Malaysia as the majority of economies are reliant on them, particularly in developing countries including Malaysia. They account for more than 50% of employment and 90% of business worldwide. The SMEs in Malaysia form the heart of the economy as they are a significant sector of the economy and play a crucial role in supporting the country's economy (Mohamad A. et al., 2021; Liew, 2020). In addition, they drive economic growth and overcome the issues of unemployment among Malaysians. According to SME Corporation Malaysia (2021), the expansion of SMEs is expected across all sectors, such as services, manufacturing, agriculture, mining and quarrying and construction (SME Corporation Malaysia, 2021). Based on Department Statistics Malaysia (2020), SMEs support the community by improving living standards and bringing about a higher standard of living.

Thus, the government has introduced many entrepreneurship programmes to support young generation interested in SMEs. In addition, to meet the target of SMEs contributing 41% of GDP as outlined in the SME Masterplan 2012-2020, the Council approved eight measures to boost SME GDP annual growth during the first National Entrepreneur and SME Development Council (NESDC) meeting in 2019 on strengthening SMEs' digital transformation, enhancing their

integration into the supply chains, providing incentives to attract more high-growth SMEs, and improving SMEs' readiness and competitiveness for the adoption of "innovative-disruptive-compelling" technology and business models, accelerating alternative financing for SMEs, recovering external value chains into the country, promoting the export of home-grown payment gateway and fintech by SMEs, and finally, increasing the participation of SMEs in tourism (SME Corporation Malaysia, 2021).

Every new business and entrepreneurship start their first job with a start-up. A start-up is a business that is in its early stages of operation. Entrepreneurs create start-ups with a vision of producing a high-demand service or product. The start-up process is based on the fundamentals of management which are planning, organising, leading and control. According to Kim B. et. al. (2018), a new combination business model is the foundation of a company or start-up innovation. Apart from that, the success of a start-up company relies on its ability to combine technology and the market in a way that supports the needs and expectations of its users (Kim, B. et al., 2018). Weking et al. (2019) agreed that the business model is essential and impacts start-up success.

When starting a business, the owner should keep in mind that it must go through certain stages. This process is also known as the business venture's life cycle. The main stages consist of the incubation stage (pre-start up), start-up stage, growth

stage, maturity stage and decline stage. Based on business venture's life cycle, harvesting does not enter the mind of the entrepreneur during the second stage of start-up, as this stage is associated with an increasing risk and potential for business failure. According to Weking et. al. (2019), majority of start-ups fail, with estimates ranging from 50% to 83% and as high as 90% (Weking et. al, 2019). Start-up business is full of opportunity, innovation and potential. However, it is also distracted with high-stakes risks. On that account, this paper aims to discuss the significance of risk management in start-up businesses and to develop a new idea for future study as an alternative to risk management tools.

The structure of this review paper consists of six sections: introduction, literature review, discussion and future study, conclusion, acknowledgement, and references. For the literature review, this study discusses the characteristics of an entrepreneur, factors of success and failure of start-up business in SMEs, and risk and risk management of start-up business in SMEs.

LITERATURE REVIEW

This paper will go through some previous studies discussing the characteristics of entrepreneurs and the factors of success and failure of start-up businesses in SMEs. Then, the researcher moves to the discussion on the challenges and risks that any start-up business might face. Lastly, the researcher discussed risk management for start-up businesses in SMEs.

Characteristics of Entrepreneur for Start-up Business in SMEs

There are many previous studies done in discussing on the characteristics of entrepreneur in SMEs (Mashuda, A., & Laily, N., 2021; Soomro, B.A. et al., 2021; Badawi, S. et. al., 2019; Che Embi, N. A. et. al., 2019; Reyad, S. et. al., 2019; Mahmood, T. M. A. T et. al., 2020). According to Khan S. & Kothari, S., (2020), an entrepreneur is a person who seeks out new opportunities and is willing to take a risk to make money. Furthermore, he/ she focuses on management, having a source of networking, and knowing how to use his/ her knowledge tactics effectively. Meanwhile, a start-up defined as creating an identity and making money, which typically consists of two or three entrepreneur individuals for funding. The main challenge for start-up is demonstrating the validity of the concept to potential lenders or investors. Although the start-up and entrepreneur may appear to be the same thing, they are not. For instant, in terms of their intention toward business, an entrepreneur aims to achieve a financial goal, whereas the start-up founder seeks to provide a unique product or services to the general public (Khan S. & Kothari, S., 2020).

The previous study that studied on characteristics of entrepreneur for start-up business in SMEs is done by Mashuda, A., & Laily, N. (2021). The goal of this research is to determine whether entrepreneurial skills affects students' entrepreneurial attitudes. Five types of entrepreneurial ability, which are risk-taking, leadership, innovation, problem-solving, and communication ability, were studied in this paper. The researchers found that risk-taking and innovation ability affected entrepreneurial attitudes while leadership,

communication, and problem-solving ability did not (Mashuda, A., & Laily, N., 2021). Other research study on entrepreneurial attitude had been done by Soomro, B.A. et. al. (2021). The entrepreneurial attitude orientation (EAO) model is used in this study to predict students' attitudes toward entrepreneurship in Thailand. The finding of the research is achievement, personal control and innovation have a positive significant impact on attitudes toward entrepreneurship. However, self-esteem has no effect on attitudes toward entrepreneurship (Soomro, B.A. et. al., 2021).

Badawi, S. et. al. (2019) done a research to look into business undergraduates' attitudes toward entrepreneurship, specifically four entrepreneurship skills. The four entrepreneurship skills are risk-taking, critical thinking, problem solving and innovation skill. By using a logistic regression, it is found that all the four entrepreneurship skills are significantly affects on entrepreneurship cognition. Hence, it is proven that students of business recognize the four entrepreneurial abilities/skills as essential to starting up their own company. (Badawi, S. et. al., 2019). According to Che Embi, N. A. et. al. (2019), the ability to lead, success requirements, readiness for risk-taking, and tolerance of ambiguity are positive factors associated with Malaysian students' intention to engage in entrepreneurial activities. This study was run by quantitative study and the respondents are among 257 students from entrepreneurship course and programmes. The data in this study was analysed by using Exploratory Factor Analysis, Confirmatory Factor Analysis and Structural Equation Modelling (Che Embi, N. A. et. al., 2019).

Reyad, S. et al. (2019) discussed the evidence of accounting undergraduates' attitudes toward entrepreneurship, including whether the skills learned in the classroom are reflected in their awareness of and willingness to start their own business. It is revealed that the accounting students regard the skill of risk-taking, thinking critically, solving problems, and coming up with new ideas. Furthermore, students from Egypt tend to think about cognition more than Bahrainis do about intentions (Reyad, S. et. al., 2019). Another previous study done by Mahmood, T. M. A. T et. al., (2020) aims to investigate the impact of selected entrepreneurial traits on Asnaf Millennials' attitudes towards entrepreneurship in Malaysia. Findings in the paper indicate that innovativeness, internal locus of control, the achievement need, and proactive personal characteristics can all positively influence the attitude of respondents. However, tolerance for ambiguity and propensity for taking risks does not have significant effect on Asnaf Millennials' perspective. (Mahmood, T. M. A. T et. al., 2020).

There are several studies done by previous researchers found that the risk-taking skills has a positive effect on entrepreneurship (Mashuda, A., & Laily, N., 2021; Badawi, S. et. al., 2019; Che Embi, N. A. et. al., 2019; Reyad, S. et. al., 2019) and only one paper resulted that risk-taking does not have significant towards entrepreneurship (Mahmood, T. M. A. T et. al., 2020).

Factors of Successful and Failure Start-up Business in SMEs

Boyoung Kim et.al. (2018) had studied on critical successful factors for design a start-up business. The researchers are attempting in identifying the critical success factors influencing design start-ups. Based on previous research, the concepts and characteristics of successful start-up were investigated. A survey was done among 12 design-based small venture start-ups and 12 technology-based small and medium start-ups. The survey was done concerning their priorities related to four success factors: entrepreneurship, innovation, technology, and economics. Then, the start-up success factors were analysed using the analytic hierarchy process (AHP) to determine critical success factors and weightage in the evaluation system. It is found that the most important success factor among four success criteria for design start-up is idea commercialization as an innovation criterion. As a result, the study concludes that entrepreneurial conditions like goal-orientation and entrepreneurial competency play a critical role in successful start-ups. In addition, Yagmur Yildiz (2020) agreed that entrepreneurial traits are among the factors influencing start-up selection and performance. It has a greater impact than considerations of idea quality, market characteristics and profit potential of an entrepreneurial project (Yildiz, Y., 2020). Hence, entrepreneurial characteristics such as leadership capabilities, educational level of entrepreneurs as well as managerial and networking skills are highly dependent on enterprise performance from the perspective of micro and small firms (Lubis, R. L., 2017).

Liaw Jia Chien (2019) studied the factors that contribute to the success of SMEs in Malaysia. Her study aims to discuss the critical success factor (CSF) in Malaysia based on entrepreneur's traits and business operation. By using qualitative research, the survey was done among 143 respondents and the data was analysed using Statistical Package for Social Science (SPSS). The finding of this paper is the most critical success factor is having good management abilities, while the biggest obstacle is the insufficient of market fit for the product or service. They recommended having mentor feedback constantly. It is found that hardworking entrepreneur with good management abilities, a reputation for honesty and a high level of integrity are the top three of success factors based on entrepreneur's traits. Besides, the top three success factors based on the operation of the business are having competitive services or products, providing excellent customer service and ensuring the quality of the product (Liaw, J. C., 2019). Then, the researcher also found three top barriers and solutions based on entrepreneur's traits and business operation that will be discussed in Section 2.3. The other research done by Kee, D.M.H. et. al. (2019) found that technology-related, soft-related and finance-related support have a significant correlation with the start-up success. Surprisingly, market-related support had no significant relationship with start-up success (Kee, D.M.H. et. al., 2019).

Even though there are many factors that influence the successful performance of start-up business, entrepreneurs should also be concerned about the factors that cause a failure of start-up business. There is much literature focusses on successful start-up and reasons for their success while

ignoring the innumerable lessons from failed ones. According to Krishna et. al. (2016), there are many start-ups facing a failure. Hence, Marco Cantamessa et. al. (2018) in their study on "Start-ups' Roads to Failure" aims to provide a repeatable and scalable methodology for deriving start-up failure patterns from documents related to post-mortems that are in unstructured databases. It is found that no or inappropriate business model, as well as the lack of business progression are two main reasons for failure of start-up business. The researchers used a massive database of 214 start-up reports a of post-mortem in making the analysis of this research. This supported by Weking et. al. (2019) as he agreed that business model is essential for start-up success, considering it gives clear guidance for start-up survival. Business models are crucial for competitiveness because they can create a new factor of innovation (Weking et. al., 2018).

According to Weking et. al. (2019), there are study state that business model influences its performance by demonstrating using qualitative research. But, lack of large-scale quantitative studies to analyse the association between the company's business plan and business achievement. As a result, the researcher examined a dataset of 500 start-ups and investigated the connection between the business planning designs they used and their performance outcomes. It resulted in two different business designs being strongly associated with more remarkable start-up survival, while four designs were remarkably associated with poor start-up survival. Hence, the researcher concludes that the business model is vital for performance. His research highlighted the roles of a business model as a beneficial theoretical concept in the management of the business study and a guideline for a new business. In addition, Massa et al. (2017) agreed that a company's business design impacts efficiency. Furthermore, business model becomes one of the three most preliminary designs used by investors for start-up business assessment (Prohorovs, A., 2018; Bussgang, J., 2017). However, it is depending on what business model pattern are used. There are specific of business model that boost the probability for start-up survival such as Freemium and Subscription, and there are patterns that decrease like Cross Selling (Weking et. al., 2018). Haddad, H. et. al. (2020) studied on relationship between business models and start-up performance. The study revealed that some patterns outperform others, but on different measures of performance (Haddad, H. et. al., 2020).

Besides, managements or founders pay an insufficient attention on commercial development because focusing too much on the product or service can lead to failure of start-up business. The fourth main reason for failure according to this paper is lack of product or market fit (Cantamessa, M. et. al., 2018). Marc Andreesen (2007) defined product-market fit as "being in a strong market with a good or service that can fulfil that market". Boonmalert, W. et. al. (2020) found that market orientation has a beneficial effect on the business achievement of companies. Furthermore, market orientation positively influences on customers' loyalty and business achievement (Boonmalert, W. et. al., 2020). Another researcher who studied the start-up success factors is Prohorovs, A. et. al. (2018). Her study is focus on capital attraction stage in founder's perspective. The paper evaluates the causes that start-ups owners believe are essential to draw

the attention of investors among founders of forty start-ups in Latvia and Russia. A survey was conducted for data collection by distributing a questionnaire among young innovative companies. It is found that investors' evaluation of the project and the team's management abilities are the most vital variables that determine financing success. According to Zobnina (2015), the availability of financing resources is an essential element for successful start-up companies based on entrepreneurs' perspectives (Zobnina, 2015). So that, entrepreneurs should focus on the successful factors for financial sources. This is because, running out of cash can lead to failure of start-up business (Weking et. al., 2019).

Hence, Usama, K. M., & Yusoff, W. F. W. (2018) believed that entrepreneurs' financial literacy is one of the most important variables that contribute to business success. The looks into the link between financial awareness and performance outcomes among Bauchi State Nigeria entrepreneurs. The data was collected using primary data by handing out questionnaires to a random group of 500 entrepreneurs. However, only 386 useable returned questionnaire that can be analysed. The researcher divides the financial literacy into 3 aspects which are financial knowledge, financial behaviour and financial attitude. These three aspects are considered as independent variable for the study. The findings demonstrated a strong connection between various aspects of financial awareness and start-ups companies' achievement (Usama, K. M., & Yusoff, W. F. W., 2018). Hence, this approved that financial awareness is crucial in improving business achievement.

Risk and Risk Management of Start-up Business in SMEs

Despite the fact that many entrepreneurs succeed in their enterprises, past research have shown that many start-up businesses struggle to thrive and fail. Start-ups have problems and hurdles in surviving and sustaining their businesses, with failure rates ranging from 50% to 95% in emerging countries like Malaysia (Kee, D.M.H. et. al., 2019). In addition, based on prior research on SMEs in Malaysia from 2001 to the present (2020), it has been discovered that SMEs confront a number of obstacles, problems, and difficulties that limit their ability to expand. Many SMEs face challenges in ensuring their long-term viability as well as remaining competitive in a market that is constantly changing (Mohamad, A., et. al., 2021).

Liaw J. C. (2019) discovered top three barriers in SMEs based on entrepreneur's traits and business operation. Lack of capacity to make sound business decisions, lack of organisational skills, and lack of financial management skills are the top three impediments identified by entrepreneurs. While, top three barriers based on business operation are no market fit and needs, financial issues and failure to maintain close relationship with customer. Besides, the study also suggests various remedies for Malaysian SMEs, including getting input from mentors, participating in tech partner networking, start-up networking, business education, and performing customer interviews and feedback to improve the product (Liaw, J. C., 2019).

According to Razak, D. A., et. al. (2018), SMEs in every country have their own issues and challenges that contribute

significantly to the growth of each country's SMEs. The paper examined three aspects in the Kobayashi (1997) micro model for SMEs: financial support, influence of knowledge-based economy, and impact of marketing aid, using secondary data and literature reviews from prior studies. The paper found that SMEs still face challenges in obtaining financing because of poor creditworthiness, lack of collateral, lack of financial recording, insufficient loan documentation and lack of business viability. Furthermore, in terms of the impact of the knowledge-based economy, SMEs face difficulties in resolving a variety of management issues and in comprehending financial statements required for planning. Finally, one of the issues that SMEs encounter when it comes to the impact of marketing support is that they do not spend enough time understanding their unique selling point owing to a lack of knowledge. Hence, this paper help researcher to understand the issues and challenges faced by SMEs in Turkey and Malaysia (Razak, D. A., et. al., 2018).

The purpose of risk management is to minimise the impact of potential losses while reducing potential risks. Companies have used risk management as one of their primary strategies for ensuring their existence and overcoming uncertainties in order to achieve their objectives. It is critical because the business is subject to external unpredictability caused by political difficulties, economic conditions, environmental elements, and technology advancements.

Ferreira de Araújo Lima, P. et. al. (2020) studied on a systematic literature review and future directions of risk management in SMEs. The purpose of this study is to describe the evolution and current condition of risk management in SMEs, as well as to highlight new research prospects in this area in the future. The researcher chose 61 papers that were published between January and December 2016 and analysed them using bibliometric methods and a systematic literature review. Some risk management techniques, such as financial risk management and enterprise risk management, have been determined to be among the most thoroughly explored in the literature. However, they claim that a holistic approach is still not widely adopted or developed sufficiently in SMEs. The researcher emphasized the important of new theoretical and practical studies on risk management will assist SMEs in protecting the value of their business (Ferreira de Araújo Lima, P. et. al., 2020).

According to Rehman, A., & Anwar, M. (2019), in terms of globalization, SMEs face higher risks due to their limited resources and small size. As a result, the researchers looked into the function of enterprise risk management practises in mediating the relationship between company strategy and SME performance. The study focuses on the importance of business strategy on SME success, as well as the role of enterprise risk management as a mediating factor. The study discovered a link between SME success and corporate risk management and business strategy. Furthermore, enterprise risk management mediates the relationship between company strategy and SME performance to some extent. The study employed Structural Equation Modelling (SEM) in AMOS for hypotheses testing in order to analyse the data collected from 327 Pakistani SMEs. The researchers believed that SMEs can minimize a significant loss that may occur due to negligence

of risk management through enterprise risk management practices (Rehman, A., & Anwar, M., 2019).

Prioteasa, A. et al., (2020) in his study entitled “Risk Management Practices in Small and Medium Enterprises: Evidence from Romania”, believed that SMEs face a variety of risks and their survival is more easily jeopardised due to a lack of resources, both financial and non-financial. Hence, the study's goal is to see if organisational characteristics in Romanian SMEs influence how risk management is integrated into their current activities. Furthermore, it aims to examine if there is a link between the extent to which small businesses adopt risk management methods and the extent to which risk management is integrated into present activities. The extent to which risk management is integrated into SMEs' current activities is influenced by organisational differences, according to One-way ANOVA and Multiple Linear Regression. The findings also show a positive relationship between the risk management practices in SMEs and the addition of information related to risk management in current activities.

The findings for previous studies mostly believe, there are risks and challenges that entrepreneurs should be handle and manage carefully. Therefore, entrepreneur cannot be neglect the importance of risk management for the survival of start-up businesses.

DISCUSSION AND FUTURE STUDY

From the review of characteristics of entrepreneur, it is found that entrepreneurship performance influenced by entrepreneurial characteristic. It also shows that risk-taking skill is one of the most crucial characteristics of an entrepreneur. This is because of the nature of business is full of risks and challenges. Another characteristic that mostly studied on the previous research are innovation and critical thinking. These two characteristics are essential for start-up business to solve problems and create new idea for their business. Aside from that, risk-taking, innovativeness, and proactiveness are critical dimensions of entrepreneurial orientation which is a part of entrepreneurship theory (Wang et al., 2015; Mishra & Zachary, 2015).

Entrepreneurial characteristics highlighted in the study can be one of the key factors in risk management for start-up businesses in SMEs. They can be used as a guideline for future research to select the respondents for study on risk management of start-up business. However, the study found a gap in respondents chosen in the previous studies. The selected respondents in most of the studies are students. Consequently, future studies should include successful entrepreneurs in small and medium-sized enterprises.

Table 1: The summarization of previous literature review on characteristics of entrepreneur for start-up business in SMEs

Authors	Objective	Findings	Gaps
(Mashuda & Laily, 2021)	To determine whether entrepreneurial skills affects students' entrepreneurial attitudes	- Risk-taking and innovation affected entrepreneurial attitudes - Leadership, communication, and problem-solving not affected entrepreneurial attitudes	- Respondents are not entrepreneurs in SMEs
(Soomro et al., 2021)	To predict students' attitudes toward entrepreneurship by using entrepreneurial attitude orientation (EAO) model	- Achievement, personal control and innovation positively impact entrepreneurial attitudes - Self-esteem has no effect on entrepreneurial attitudes	- Respondents are not entrepreneurs in SMEs - Study taken place in Thailand not in Malaysia
(Badawi et al., 2019)	To study business undergraduates' attitudes towards entrepreneurship	- Risk-taking, critical thinking, problem solving and innovation skill affect entrepreneurship	- Respondents are not entrepreneurs in SMEs
(Che Embi et al., 2019)	To investigate the students' entrepreneurial characteristics towards entrepreneurship	- Leadership, success requirements, readiness for risk-taking, and tolerance of ambiguity positively associated with entrepreneurial intention	- Respondents are not entrepreneurs in SMEs
(Reyad et al., 2019)	To investigate accounting undergraduates' entrepreneurial attitudes toward entrepreneurship	- Risk-taking, thinking critically, problem solving, coming out with new ideas impact entrepreneurship	- Respondents are not entrepreneurs in SMEs
(Tuan Mahmood et al., 2020)	To investigate the impact of selected entrepreneurial traits on Asnaf Millennials' attitudes towards entrepreneurship	- Innovativeness, internal locus of control, the achievement need, and proactive personal characteristics positively influence entrepreneurship	- Respondents are not entrepreneurs in SMEs

Table 2 shows the summarization of successful and failure start-up business in SMEs. It gives some view on the relationship between factors that effects the performance of

start-up business. Besides, it also shows that some of the characteristics in Table 1 related to some of the factors of success and failure of start-up business.

Table 2: The summarization of factors of successful and failure start-up business in SMEs

Authors	Factors of successful start-up business in SMEs	Factors of failure start-up business in SMEs
(Kim et al., 2018)	- Goal-orientation - Entrepreneurial competency	- No study on failure start-up business in SMEs
(Yildiz, 2020)	- Entrepreneurial traits	- No study on failure start-up business in SMEs
(Lubis, R. L., 2017)	- Entrepreneurial characteristics (leadership capabilities, educational level of entrepreneurs, managerial and networking skills)	- No study on failure start-up business in SMEs
(Liaw, J. C., 2019)	- Having good management abilities	- Insufficient of market fit for the product or service
(Kee et al., 2019)	- Technology-related support - Soft-related support - Finance-related support	- No study on failure start-up business in SMEs
(Cantamessa et al., 2018)	- No study on successful start-up business in SMEs	- No or inappropriate business model - Lack of business progression - Pay an insufficient attention on commercial development - Lack of market or product fit
(Weking et al., 2019)	- Having a business model	- Running out of cash

In addition, the study found that the success and failure in start-up businesses are related to risk and challenges in start-up business in SMEs. The risks found in previous studies are entrepreneurial traits, financial risks, organizational risks, marketing risks, management risks, and customer risks. It will be helpful in a future analysis of the risk factors associated with successful risk management of a start-up business in SMEs. Then, it is suggested to interview expertise in SMEs to validate the factors of risk found in previous studies and get the weightage for each factor.

Besides, the study found the risk management techniques used in previous studies are financial risk management, enterprise risk management and corporate risk management. These risk management practices are essential to encounter the risks and challenges faced by SMEs. Thus, this study gives new ideas for future research to study other alternative techniques used in risk management like mathematical risk management index.

CONCLUSION

As a result of this review, it comes out with some factors that are likely to affect the success or failure of start-up businesses. There are a number of challenges and risks that must be managed for any start-up businesses. Hence, risk management is an importance thing for a start-up business in SEMs. Da Silva Piñeiro, F. et. al., (2017), claim that the start-up environment is characterized by extreme uncertainty, so that a start-up business must be ready to deal with unknown situations (da Silva Piñeiro, F. et. al., 2017). For example, coping with accidents like coronavirus pandemic or unexpected extreme weather, which can give impact to business for long periods of time. Therefore, we are very aware of starting up risk management in entrepreneurship, but

system backup for such a problem is also crucial, such as insurance or takaful protection (Ghazali et. al, 2019a, 2019b, 2017, 2012a, 2012b, 2012c). As part of the start-up business, new risk management tools, such as mathematical risk indexes, should be developed. These mathematical risk indexes can be used to determine a business' readiness before the start-up period begins. Thus, this review paper gives new idea for future study on developing new risk management index as an alternative for current risk management tools.

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