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Exploratory Factor Analysis of Risk Intelligence Factors in Nigerian Small and Medium Enterprises

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Abstract

Exploratory factor analysis (EFA) is usually necessary to uncover the right items for inclusion in a research instrument. As a result, this research adapts and modifies an instrument on the risk intelligence construct within small and medium enterprises (SMEs) in Nigeria. The study uses Hawley's risk theory of profit and employs the EFA to validate the instrument. Our study differs significantly from prior studies regarding SMEs' socio-economic, political, and cultural statuses, among other factors. More importantly, most past research focused on larger firms or used different dimensions. However, the current study uniquely integrates risk perception, risk-taking propensity, and insurance literacy within Nigerian SMEs to close the literature gap. The study adopts a cross-sectional research approach using quantitative data obtained through a structured survey from 370 SMEs across Nigeria's six geopolitical regions. The study tested the validity and reliability of the constructs used and refined the 27 items used. The EFA result finally reduced the items to 24; risk perception (6 items), risk-taking propensity (9 items) and insurance literacy (9 items).

1. Introduction

Economic growth and development are two of the main macroeconomic objectives of every country worldwide. However, at the heart of accomplishing these societal goals are the small and medium-scale enterprises (SMEs). SMEs are viewed as growth engines since they contribute to economic diversity, job creation, entrepreneurial and technical development, and revenue generation (Offiong, Udoka, & Bassey, 2019). They are recognized as socio-economic development engines (Ifekwem & Adedamola, 2016) because they have been proven in advanced and developing economies. However, the SME sector experiences severe instabilities. Many SMEs are not sustainable and experience temporary or permanent shutdowns due to poor risk handling and access to finance, which pose severe societal health challenges and economic instability in Nigeria. As a result, risk managers in government and industry have been working for decades to discover more effective ways to respond to public demands for safer and healthier business environments, and risk assessment has become increasingly popular (Hafiz, Salleh, & Garba, 2021). A lot of previous research has

looked at how people make decisions when confronted with characterizing and rating risky activities and technologies (Daud et al., 2017; Hafiz, Salleh, Garba, & Rashid, 2021; Slovic, 2016).

Enterprise risk management (ERM) is concerned with how an organization's actions are planned, organized, directed, and controlled to reduce the negative consequences of risk on its capital and profitability. Risk intelligence is a new approach designed within ERM to assist businesses in preparing for any potential risk that could interrupt operations, degrade overall security posture, harm their brand, or result in losses (Saxena & Gayathri, 2022).

Studies have investigated the link between individual risk intelligence factors and SMEs within the context of ERM. For example, studies on risk perceptions include Bonfim, Silva, Prado, & Abib (2018); Grant, Edgar, Sukumar, & Meyer (2014a, 2014b); Jayathilake (2013); Mamai & Lijing (2016); Mathews, Maruyama, Sakurai, Perks, & Sok (2019); and Munyanyi & Chimwai (2019), while risk-taking propensity was studied by Kreiser, Marino, Kuratko, & Weaver (2013); Lawal, Adegbuyi, Iyiola, Ayoade, & Taiwo (2018); Rodríguez-Gutiérrez, Romero, & Yu (2020); and Salleh (2015).

Other factors such as risk knowledge management (Bratianu, Neştian, Tiţă, Vodă, & Guţă, 2020; Cardoni, Zanin, Corazza, & Paradisi, 2020; Durst & Ferenhof, 2016; Durst, Hinteregger, & Zieba, 2019) and insurance literacy (Driver, Brimble, Freudenberg, & Hunt, 2018; Uddin, 2017; Weedy, Ouyang, Gao, & Liu, 2019) were also investigated. However, none of the studies incorporated the combination of risk perception, risk-taking propensity and insurance literacy together. Risk intelligence, as a new approach to ERM, is gaining momentum, and consequently, there is a paucity of the instrument to measure the construct. As a result, the focus of this research is to look into the instruments for assessing the risk intelligence factors of SMEs in Nigeria. As recommended, the data collection instrument was adapted from a previous study and tested for validity and reliability using exploratory factor analysis (EFA) (Hoque & Awang, 2016). The study proposed an instrument that combines risk perception, risk-taking propensity and insurance literacy within Nigerian SMEs.

2. Review of the Literature

2.1. Overview of Nigerian SMEs

Small and medium enterprises (SMEs) in Nigeria have a long history. During the colonial period, local industries were ignored, and the colonial countries were treated as estates for urban trade. In some cases, they intentionally discouraged the promotion of imports. Despite this, upon independence in 1960, Nigeria inherited a sizeable small business market, with small-scale manufacturing accounting for around 15% of manufacturing production (NBS, 2017).

By the 1980s, however, small-scale manufacturing industry contributions had declined to around 10% of total manufacturing production. For the growth of micro, small and medium enterprises (MSMEs) in Nigeria, many programmes and government opportunities have been developed in the past fifty years (Ajayi, Ojelade, Adedokun, & Oladeji, 2018; CBN, 2020; NBS, 2017). As a consequence of these efforts, there are 41.5 million registered MSMEs and 73,081 SMEs in Nigeria as of 2017 (NBS, 2017).

2.2. Underpinning Theory – Risk Theory of Profit

This research found the Risk Theory of Profit fitting for its ability to establish a connection between risk intelligence and small businesses. The theory was developed by the American economist Hawley (1893). It is based on the premise that entrepreneurs take business risks for a monetary gain known as profit. Generally, risk theories seek to understand why people make decisions when uncertain about the future. Therefore, any decision people make about the future must account for a certain amount of risk. According to the theory, profit is the compensation that entrepreneurs receive for relieving the risk of other productive factors in competitive conditions (Boianovsky, 2008). Therefore, there is a positive relationship between risk and profit. High-risk businesses produce higher profits, and vice versa. The risk theory is pertinent to the present study as it explains how risk intelligence factors relate to firms' sustainable performance. Offiong et al. (2019) supported that risk and profit are directly related. However, profit is a measure of sustainable performance.

While Hawley used the terms "risk" and "uncertainty" interchangeably, he paid close attention to insurance consequences in his argument. According to Hawley, the act of insurance does not mean that the risk or the profit is no longer present. Instead, the entrepreneur transfers a portion of the projected income to the insurer. Debate exists within the literature about how far risk perceptions are influenced by the decision-makers' attributes (such as attitudes and beliefs) or propensity to take risks, called risk traits (Holland, 2020). However, drawing from Hawley's risk theory, personal attributes of the entrepreneur influence their decision-making; hence, the study established the existence of a relationship between risk perception and SMEs.

Similarly, profit was considered the price that society pays to assume a business risk. Since risk-taking is an inevitable component of dynamic production, those who took the business risk (Pieper, Greenwald, & Schlachter, 2018) had a right to a separate reward in profit (Chakraborty & Swinney, 2021). Therefore, it is logical to assume the existence of a relationship between SMEs' risk-taking propensity and profit. Thus, profit is the driver of economic success. Justifiably, previous studies have indicated that entrepreneurial progress and business growth rely on the risk-taking propensity of the entrepreneur (Rodríguez-Gutiérrez et al., 2020).

2.3. Dimensions of Risk Intelligence

Risk intelligence is a new approach to enterprise risk management, gaining attention over the past few years. However, there is still no consensus on what constitutes the ideal meaning of risk intelligence. Scholars shared varied but related views regarding its meaning (Apgar, 2006; Evans, 2015; Funston & Wagner, 2010). The term refers to "the capacity to learn about risk from experience". It denotes a person or organization's capacity to weigh risks effectively and includes characterizing, classifying, and measuring threats; perceiving relationships; quickly learning; retrieving, storing and acting on relevant information; effectively communicating; and adapting to new situations (Apgar, 2006). According to Evans (2015), risk intelligence is "the ability to estimate probabilities accurately". It is a special kind of intelligence that enables thinking about risk and uncertainty. Essentially, an organization has a risk-intelligent culture when workers' awareness and behavior toward risk enable them to regularly make reasonable risk-based decisions that can drive the organization forward. The strategy allows observations to be transformed into superior judgement and realistic behavior to strengthen resilience to adversity and increase agility to capture opportunities (Krell, 2010).

Craparo, Magnano, Paolillo, & Costantino (2018) developed the Subjective Risk Intelligence (SRI) construct using problem-solving self-efficacy, emotional stress vulnerability, imaginative capability and positive attitude toward uncertainty. Risk perception gets its root from the perspective of emotional stress vulnerability developed by Craparo et al. (2018) in their SRI study. In line with this, Jackson, Allum, & Gaskell (2006) observed that risk should be broadened in addition to the strict consideration of probability calculation: Fear and other emotions should be considered in risk perception. Concurrently, Foo (2011) asserts that some background emotions may affect risk perception. Similarly, risk-taking propensity appears to be a by-product of a positive attitude toward uncertainty from the above perspective. According to this viewpoint, risk propensity stems from socially acquired or evolved forms of feeling, thinking, and acting (Craparo et al., 2018).

Decision scientists claim that risk-taking is a logical, economic mechanism by which people can measure and decide objectively on potential benefits and losses; others argue that there are other more subjective, situational factors on risk propensity (Hillson & Murray-Webster, 2011). This view is consistent with Wärneryd (1996), who stated that risk-taking propensity can arise from choosing between a specific alternative and a potential alternative or between two possible alternatives with the same or unequal expected benefit. On the other hand, insurance literacy evaluates an individual's knowledge, skills, and confidence in selecting insurance mechanisms, among other personal risk management strategies. The concept enables individuals and firms to choose appropriate insurance products with appropriate coverage to handle the potential risk. It directs the user's comprehension of their rights and responsibilities when using the insurance product and their awareness of important facts. According to Lin, Bruhn, & William (2019), insurance literacy implies knowing and understanding the concept of insurance and being knowledgeable and informed about the insurance products under consideration. However, there was a significant gap in the literature regarding measuring insurance literacy, as observed by Weedy et al. (2019). There are currently no widely recognized standardized instruments for measuring insurance literacy other than health insurance literacy. Consequently, we used risk perception, risk-taking propensity and insurance literacy to proxy risk intelligence within the context of Nigerian SMEs.

2.3.1. Risk Perception (RP)

The conclusions of the risk perception study revealed that professionals and individuals regularly disagree about how harmful technology and natural risks are. Several theoretical models have been developed to understand better how risk is viewed, how people absorb risk information, and how they make decisions regarding risk. However, no universally acknowledged description of risk perception exists. Researchers have not reached a consensus on whether likelihoods and outcomes are risk perception dimensions. However, for most ordinary people, the severity of the outcome is a more crucial aspect than probability (Bohm & Harris, 2010). Scholars concluded that no firm can thrive unless it takes or accepts some level of risk (Hafiz, Salleh, Garba, et al., 2021). What is particular for SMEs is identifying, accepting and managing risks (Salleh et al., 2021) and the benefits from the opportunities that come with them. Two elements are critical to organizational progress regarding risk perception: the organization's risks in achieving its strategic goals and its ability to manage those risks. Different people may see the same circumstance as having varying levels of risk (Salleh & Ibrahim, 2013).

2.3.2. Risk-Taking Propensity (RT)

The beliefs and attitudes of business owners/managers are related to adopting risk management practices in the business world. People's mindsets towards risk-taking, i.e., risk behaviors, such as risk propensity and risk aversion, have been much less studied than risk behavior and perceptions (Rohrmann, 2011). People's inclination to behave in a particular manner in the face of risk is called risk-taking propensity (Hillson & Murray-Webster, 2011). Risk propensity finds its root when managers demonstrate their ability to make decisions that have not been proved successful or profitable in the past for the organization. An individual's predisposition to show risk avoidance or acceptance when faced with risky situations defines his propensity to risk (Lawal et al., 2018). A more risk-seeking mindset leads to a more realistic approach to critical strategic

decisions in the decision-making process (Francioni, Musso, & Cioppi, 2015). Abdullah & Shukor (2017) added that optimistic risk-taking attitudes combined with sound financial literacy could understand market volatility and sound financial and strategic performance.

2.3.3. Insurance Literacy (IL)

Insurance literacy research is still in its infancy and has gained little publicity. In terms of a thorough analysis of the various forms of personal insurance relative to general insurance, the concept has gained little coverage in the literature (Driver et al., 2018). Most of the available studies used financial metrics such as inflation, compound interest, and risk to evaluate insurance literacy (Uddin, 2017). According to Weedy et al. (2019), insurance literacy can be described as having knowledge and understanding of personal risk exposure, risk handling methods, insurance system activity, appropriate insurance policies, insured rights and duties, the inquiry process, and application of that knowledge in insurance decision making. Extant literature shows that insurance and risk literacy, and by extension financial literacy, enables entrepreneurs to manage business dynamics and financial market challenges to achieve economic success (Ye & Kulathunga, 2019).

3. Methodology

The study employs a quantitative research design that collects cross-sectional data from Nigerian SMEs. The quantitative technique is most commonly employed in social sciences to analyze numerical data acquired from the field (Tracy, 2019). A questionnaire is used for data collection in a survey design. It paves the way for a quantitative or numerical description of a population's trends, behaviors, or attitudes by analyzing a population or sample (Creswell & Creswell, 2017; Sekaran & Bougie, 2003). All SMEs in Nigeria operating in the six geopolitical zones (North West, South West, North East, North Central, South-South, and South-East) were included in the study's target population. The 73,081 SMEs registered with the Nigerian Small and Medium Enterprise Development Agency (Garba, Salleh, & Hafiz, 2021; NBS, 2017) are included. According to Hair, Hult, Ringle, & Sarstedt (2017), in social and management science research, a suitable sample size should be five times (minimum) or ten times (maximum) the number of construct elements to be investigated. As a result, the study pulled 370 SMEs from the study area as a sample. Following past studies in the fields of risk, sustainability and small businesses, the study adapted structured questionnaires for data collection (Agyei, 2018; Ahmed, Rehan, Chhapra, & Supro, 2018; Ajike, Kelechi, & Kwarbai, 2016; Akhtar, Ismail, Ndaliman, Hussain, & Haider, 2015; Al-ahdal, Alsamhi, Tabash, & Farhan, 2020; Ameer & Othman, 2012; Awang, Hoque, Muda, & Salleh, 2017; Caputo, Carrubbo, & Sarno, 2018; Chege & Wang, 2020; Salleh, 2015; Spicka, 2020; Yang, Tan, & Peng, 2020; Yusliza et al., 2020; Zanin et al., 2020).

3.1. Research Instrument

A research instrument is a tool used in quantitative research to collect, observe, or document data. It contains specific questions and possible responses that have been adopted, adapted, and adjusted to fit the needs of a particular study (Creswell, 2012). If an existing test or other data collection tool is available, it is recommended that researchers should use it because the reliability and validity of the information are already known. In order to undertake an exploratory factor analysis (EFA), the questionnaire was adjusted and modified accordingly, and the final questionnaire utilized in the study is shown in Table 1.

3.2. Exploratory Factor Analysis (EFA)

The factor analysis describes observed variables and their covariance structure in terms of unobserved variables (i.e., factors). Exploratory and confirmatory factor analyses are the two types of factor analysis. The most commonly used of the two is the exploratory factor analysis (Morin, Myers, & Lee, 2020). In exploratory factor analysis, principal component analysis and principal axis analysis are frequently used (Kalantan & Alqahtani, 2019). The items used in this study were adapted from earlier researchers' instruments, with certain statements changed to ensure relevance to the current study. The items adapted were subjected to exploratory factor analysis using the principal component analysis. If a researcher updates statements suited to the current study and adjusts the instruments already set by the researchers, they must use the EFA technique (Awang et al., 2017). The present study may differ from earlier studies on the current research population's socio-economic, ethnic, and cultural characteristics. As a result, some objects may have been developed previously and are no longer relevant for the current study. Consequently, researchers must recalibrate the existing instrument's internal reliability value (Chik & Abdullah, 2018).

4. Results of Exploratory Factor Analysis

A total of 370 respondents were used in this study to define the fundamental dimensions and items of the FI construct and to validate the instrument's quality. With a total of 27 items, we include three dimensions of the construct: risk perception, risk-taking inclination, and insurance literacy. Eight of the 27 items in the RI construct pertain to the risk perception dimension, nine to the risk-taking propensity dimension, and ten to the insurance literacy component. The study's results are detailed in Table 2.

Table 1. Source(s) of the data collection instrument.

Label	Risk Perception (RP) Items	Source(s)
RP1	Our company has a good chance of succeeding.	Keil et al. (2000)
RP2	Unexpected operational disruption is a greater risk to our business.	Islam & Tedford (2012)
RP3	Our company employee error rates are low and have no adverse effects.	Kotaskova, Belas, Bilan, & Khan (2020)
RP4	Financial risk is something our company considers a regular part of doing business.	Kotaskova, Lazanyi, Amoah, & Belás (2020)
RP5	The loss of customers is our biggest concern.	Dvorsky, Popp, Virglerova, Kovács, & Oláh (2018)
RP6	Our company is capable of effectively managing financial risk.	Kotaskova et al. (2020)
RP7	Our business has a slim chance of succeeding.	Keil et al. (2000)
RP8	Our company understands that we should handle our company's financial risks effectively as investors.	Belás, Bartoš, Ključnikov, & Doležal (2015)
Label	**Risk-Taking Propensity (RT) Items**	**Source(s)**
RT1	I am prone to taking risks.	Maddux & Galinsky (2009)
RT2	The company can take on high-risk business ventures.	MacCrimmon & Wehrung (1985)
RT3	Our company has grown by taking calculated risks at the right times.	Janz, Wetherbe, Davis, & Noe (1997)
RT4	We take significant risks to acquire a competitive advantage in our firm.	Janz et al. (1997)
RT5	If an idea seems promising, we will take a risk on it.	Ruderman, Ohlott, Panzer, & King (2002)
RT6	Anything worth doing deserves to be done flawlessly.	Salleh & Ibrahim (2011)
RT7	Business success is as much a matter of luck as talent.	Salleh & Ibrahim (2011)
RT8	Only in the absence of viable alternatives does taking business risks make sense.	Salleh & Ibrahim (2011)
RT9	Our biggest concern when deciding on unknown results is potential losses.	Salleh & Ibrahim (2011)
Label	**Insurance Literacy (IL) Items**	**Sources**
IL1	Our company is well versed in the concept of risk exposure.	Hongbing (2019)
IL2	Our company is very familiar with risk mitigation strategies.	Hongbing (2019)
IL3	We have a vast knowledge of insurance concepts.	Hongbing (2019)
IL4	We are aware of the advantages of insuring our business.	Hongbing (2019)
IL5	We know the rights and duties of the insured.	Hongbing (2019)
IL6	We are well versed in insurance information sources.	Hongbing (2019)
IL7	The primary goal of insurance is to reduce the consumer's financial exposure to risk.	Tennyson (2011)
IL8	Insurance is the most effective risk-mitigation method available.	Weedy et al. (2019)
IL9	Premiums paid for insurance get a maturity value after a specific period.	Weedy et al. (2019)
IL10	Buying insurance coverage directly from the company rather than through an intermediary is frequently less expensive and advantageous.	Weedy et al. (2019)

Table 2. KMO and Bartlett's Test for the RI Construct.

KMO and Bartlett's Test		
Kaiser–Meyer–Olkin Measure of Sampling Adequacy		0.886
Bartlett's Test of Sphericity	Approx. Chi-Square	6170.809
	df	351
	Sig.	0.000

Table 2 demonstrates that the risk intelligence construct has a Kaiser–Meyer–Olkin value of 0.886, higher than the required threshold of 0.60 (Hair Jr, Gabriel, Da Silva, & Junior, 2019). In addition, for the factor analysis to be acceptable, the significant value of Bartlett's Test of Sphericity must be less than 0.05. As shown in Table 2, Bartlett's test significance value is 0.000, which is below the required significance value of 0.05. As a result, a KMO score around 1.0 and a Bartlett's test significance value near 0.0 indicate that the data is sufficient and appropriate for the reduction phase (Hoque & Awang, 2016; Pallant, 2020).

4.1. Common Method Variance

According to Miller & Simmering (2022), common method variance (CMV) measures the systematic error variance shared by variables assessed with the same source or method. Jarvis, MacKenzie, & Podsakoff (2003) and Lowry & Gaskin (2014) stressed that CMV is assumed to be present when a single component accounts for more than 50% of the variance.

Table 3. Common Method Variance (CMV).

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.019	25.996	25.996	7.019	25.996	25.996

Note: Extraction Method: Principal Component Analysis.

As seen in Table 3, with the number of factors fixed at one, all 27 items were exposed to an exploratory factor analysis and principal components unrotated factor solution, yielding a total variance explained of 25.996%. Since Harman's single-factor test explains less than 50% (25.996%) of the overall variance, it may be concluded that CMV does not exist in the data set used in this study.

4.2. Total Variance Explained

Total variance explained is also a method of reducing many items into a manageable amount before further examination. Components with eigenvalues greater than 1.0 are separated into multiple components using this method (Pallant, 2020).

Table 4. Total variance explained.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.544	28.453	28.453	6.544	28.453	28.453	5.502	23.922	23.922
2	4.469	19.428	47.881	4.469	19.428	47.881	4.835	21.023	44.946
3	3.639	15.821	63.702	3.639	15.821	63.702	4.314	18.756	63.702

Note: Extraction Method: Principal Component Analysis.

Table 4 depicts how the variance is distributed among the 23 components. Three factors have eigenvalues (a measure of explained variance) larger than 1.0, typical for determining whether a factor is valid. When the eigenvalue of a component is less than 1.0, it conveys less information than a single item would. The EFA extracted three acceptable dimensions, or components, of the RI construct, as shown in Table 4, with eigenvalues of 6.544 for the first component, 4.469 for the second component, and 3.639 for the third component, respectively. This shows that the construct is divided into three dimensions or components to be studied further. The total variation explained is 63.702%, higher than the required 60%.

Table 5 shows the EFA results for all of the constructs. All items of the constructs have a factor loading greater than 0.60 (Awang, 2012; Hair Jr et al., 2019; Nunnally, 1975), showing that the scales are convergent and demonstrate discriminant validity. As a result, the finding implies that the instrument is worthy of further study. Items with coefficient factor loadings greater than 0.6 were maintained and retained, whereas items less than 0.6 were discarded from further investigation (Awang, 2012).

4.3. Reliability (Cronbach Alpha)

The ability of an instrument to consistently show the same result over time demonstrates its reliability. It determines how the instrument fits the variable consistently and reliably (Garba, Garba, & Usman, 2017; Sekaran & Bougie, 2003). Reliability analysis determines if there is much agreement across several attempts to calculate the same theoretical constructs (Hair, Anderson, Babin, & Black, 2010). A reliability test was conducted using Cronbach's Alpha coefficient. The value of the Cronbach's Alpha should be greater or equal to 0.7 for the instrument to be reliable (Hair, Ringle, & Sarstedt, 2011; Hair, Black, Babin, Anderson, & Tatham, 2006; Nasidi, Bin Ahmad, Garba, Hassan, & Gamji, 2021).

Table 6 shows the reliability results for all four constructs, demonstrating that all the three sub-constructs exceeded the minimum Cronbach's Alpha value requirement of 0.7 (Hair et al., 2011; Hair et al., 2006).

Table 5. Rotated Component Matrix[a].

Item Code	Component		
	1	2	3
RT4	0.859		
RT6	0.811		
RT5	0.800		
RT2	0.776		
RT3	0.773		
RT9	0.769		
RT8	0.755		
RT1	0.735		
RT7	0.677		
IL8		0.812	
IL3		0.811	
IL4		0.802	
IL2		0.776	
IL7		0.775	
IL6		0.764	
IL5		0.760	
IL10		0.613	
RP3			0.908
RP2			0.871
RP4			0.854
RP7			0.832
RP8			0.796
RP1			0.796

Notes:
Extraction Method: Principal component analysis.
Rotation Method: Varimax with Kaiser normalization.
a. Rotation converged in five iterations.
Factor loadings < 0.60 were removed.

Table 6. Reliability Statistics.

No.	Construct	Deleted Items	Items	Cronbach's Alpha	Decision
1	Risk Perception (RP)	2	6	0.917	Achieved
2	Risk-Taking propensity (RT)	0	9	0.919	Achieved
3	Insurance Literacy (IL)	1	9	0.901	Achieved

5. Conclusion

The present study contributes to measuring the risk intelligence construct, particularly in Nigerian SMEs. The EFA results produced a structure that extracts three dimensions of risk intelligence. The dimensions of risk intelligence used are risk perception measured by six items, risk-taking propensity measured by nine items and insurance literacy measured by nine items. The results of the EFA for all the constructs satisfy the minimum thresholds for KMO, BTS, AVE and Cronbach's Alpha as recommended (Awang et al., 2017; Hair Jr et al., 2019). The Kaiser–Meyer–Olkin value of .886 was found to be greater than .70, indicating that each factor has enough components. The correlation matrix passed Bartlett's Test of Sphericity with a score of 0.000, which is significant (less than 0.05), demonstrating that it differs from an identity matrix, in which all correlations between variables are zero. This indicates that the constructs are sufficiently connected to give a good basis for factor analysis.

The study also tested reliability using Cronbach's Alpha to ensure the instrument's internal consistency. Cronbach's Alpha test is the most widely used method for determining internal consistency reliability (Cronbach, 1951). The internal consistency coefficient is a reliability estimate based on the assumption that items determining the same construct should correlate. Cronbach's Alpha reliability coefficients typically range from 0 to 1. All the variables tested satisfied the minimum threshold of 0.7, thus confirming the instrument's reliability. The new risk intelligence instrument is internally consistent and stable across samples considering the current study's rigorous scale development and validation methods. As a result, the study fills a gap in the literature, particularly regarding SMEs. Moreover, risk management has traditionally concentrated on avoiding risks in a business plan rather than understanding and managing the risks. While protecting current assets is essential, it is not enough to gain a competitive advantage. However, when risk is exclusively defined by an organization's failure to protect current assets and prevent loss adequately, the results can be disastrous. Therefore, rather than using old methods, risk intelligence can assist SMEs in proactively detecting and managing risk.

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