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Analyzing financial risks in small and medium enterprises: evidence from the food processing firms in selected cities in Ghana

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Abstract

Purpose – The purpose of the paper was to analyze the financial risk perception of owners/managers and to link such perception to the performance of their ventures.

Design/methodology/approach – The paper employed PLS-SEM to analyze financial risks and its impact on SMEs in the food processing sector. Financial risks data on the operational, market, technological, credit and liquidity risks and financial performance including compliance, social and resource efficiency performance were collected from 214 food processors in selected cities in Ghana. Higher-order constructs were employed in assessing the relationship between financial risks and SME performance.

Findings – Financial risk spurs a firm's financial performance. Increased financial risks cause firms to be resource-efficient and compliant. Furthermore, an assessment of how the various performance indicators interplay showed increased compliant improved social performance and vice versa.

Research limitations/implications – The paper looked at food processing firms in three major cities, analyzing the financial risks of the businesses and their effect on their performance. Although, these cities have the largest number of these firms, generalizing the findings from the study should be done taking into consideration the scope of the study.

Practical implications – The study exposes owners/managers to the critical issues of financial risk, its components and how this could impact on their operations. It expected that owner/managers in the food processing sector would craft the necessary risk mitigating strategies to deal with the different financial risks they face. For theoretical implication, the paper suggests the need to highlight the risk exposure of firms due to the business–stakeholder interactions as contained in the stakeholder theory.

Originality/value – The paper employed the higher-order construct of PLS-SEM to analyze the financial risks of food processors. The originality of the paper lies with the methods used.

Keywords Financial risks, SMEs, Food processing, SEM-PLS, Ghana

Paper type Research paper

Introduction

The financial-growth nexus (Schumpeter, 1911) argues for the critical role of finance in the growth of an economy including its agents such as the firm. The theory postulates that finance is critical in promoting innovations; and that economies with better financial infrastructure will grow faster (Jayaratne and Strahan, 1996; Hacievliyagil and Eksi, 2019). This implies access to finance is a key determinant of the firm's growth (Regasa *et al.*, 2019). This means it is imperative for the owner/manager to evaluate the nature of finance available to them, analyzing their potential risks and how such risks impact the firm. Due to their nature, SMEs potentially face moral hazards by being wrongly categorized by lenders and financial institutions. Lenders may misclassify SMEs seeking credit to manage their financial institution's default rate. Evidence from studies (Nguyen *et al.*, 2006; Ilyas, 2019) points to the difficulties of FIs in ascertaining the true quality of an owner–manager in financial transactions including credit granting and provision of financial services.

Furthermore, FIs have often contemplated the information gap based on information asymmetry theory. This theory argues that in most cases with credit-seeking transactions, the owners/managers do conceal relevant information lenders. Meanwhile, such information

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tends to affect the terms and conditions of the loan contract between the parties. The result has been an adverse selection by the lenders. Several studies have argued in this direction (Motta and Sharma, 2019; Gou and Huang, 2019; Moyi, 2019) without looking at the tendency for the owner/managers to suffer from adverse selection due to non-disclosure of credit information. There is a tendency for lenders to withhold information from their clients. Extant studies (Yen *et al.*, 2019; Oláh *et al.*, 2019; Haniff *et al.*, 2017; Rao *et al.*, 2017; Bbenkele, 2007) report owner–manager complaint about lack of transparency in credit granting contract with FIs. Lenders have often relied on their previous experience and transactions with SMEs in setting credit granting criteria. In many circumstances, although the business characteristics of the SME have changed, lenders' criteria often remain the same. This may pose a financial risk for the owner /manager as such perception tends to influence the cost of credit. Besides lenders, different actors within the business ecosystem expose the owner/manager to the different types of financial risks.

Stakeholders' theory outlines several other actors and groups that engage in a financial transaction with the business. The tenet of this theory is that businesses have actors whose actions affect the business or the firm's actions affect them. Among these actors are customers, suppliers, employees, auditors, stock and bondholders, banks, middlemen, communities, competitors and managers (Freeman, 1984; Jones, 1995; Walsh, 2005; Freeman *et al.*, 2010). Every aspect of the business–stakeholder interaction creates a financial relation and risks between the firm and the particular actor. For instance, the customer and their purchasing power could create a potential financial risk for the business. Financial relation is also created in the supplier–owner/manager interaction as well as the middleman. The tenets of the stakeholder theory are how the firm interacts with people and organizations taking into consideration the interest and power of these actors. Such interest and power have the potential to expose the business to hazards at different levels and ultimately various forms of risks (Jenkins, 2004; Yiannaki, 2012) and financial risks in particular.

The subject of financial risks in small businesses has become a subject of interest to scholars in emerging countries due to the critical role of such economic actors in development. As a part of the broader concept of business risks, financial risk concentrates on uncertainties associated with funds flow into and out of the business (Ekaterina and Thielmann, 2020). It is the unexpected variations in prices and its impact on future cash flows of a firm (Jorge and Augusto, 2011). Yang *et al.* (2020) opine that financial risk for SMEs is an estimate of their future credit status. Yet, Gabriel and Baker (1980) define it as the risk of not being able to meet prior claims with inflows generated by the business. These empirical studies focused on cash flows. There are financial risks associated with any of the business transactions with stakeholders that impact on business operations. Meanwhile, the most serious risks are economic (Kozak and Danchuk, 2016) and financial risks (Belás *et al.*, 2018; Cipovová and Dlasková, 2016; Neacsu *et al.*, 2018). As Oláh *et al.* (2019) and other similar authors opined, these risks are often difficult to deal with by the owner/managers of SMEs. An investigation into financial risks in SMEs is essential because of developments in the sector where businesses are failing due to poor cash flows, poor debt management (Asgary *et al.*, 2020), inappropriate credit-granting policy (Khan, 2020; Wasiuzzaman *et al.*, 2020) or use of the inappropriate financing methods (Utomo *et al.*, 2020; Shaverdi *et al.*, 2020) and unsuitable inventory practices (Xu and Li, 2019). Understanding their level of knowledge and how they respond to financial risks would reduce their exposure and ultimately their mitigation strategies. It is expected the appropriateness of their mitigation would help reduce the financial loss they face.

Stakeholders' interest and power have the potential of exposing businesses to different forms of financial risks impacts on their business performance. However, previous research has not looked at the perception of owners/managers about risk, especially financial risks, and how such risks affect firm performance. The paper was motivated by the need to analyze the financial risk perception of owners/managers and to link such perception to the performance of their ventures. The rest of the paper is divided into five parts. Part two was devoted to the review of the literature. The research method was discussed in the third part. The analysis of results and discussion was in the fourth part and the practical and policy implications were in the final part.

Literature review

Kundid and Ercegovac (2011) found that in comparison to large enterprises, SMEs continuously encounter higher borrowing costs, upon which this discrepancy enlarges in the aftermath and presence of financial crisis. Furthermore, the market cleaning of the SMEs' credit applications evolves on the level of higher interest rates. This comes at the backdrop of the perception that SMEs are risky to deal with. Owusu (2019), Abimbola and Kolawole (2017) argue that about 60% of SMEs fail within the first five years due to inadequate financial management skills. Similarly, Morgan *et al.* (2015) observed that the failure and poor performance of SMEs to the challenges of financial management and inventory. Such situations if not properly managed could be the basis for financial risks in the firm.

Meanwhile, previous studies conducted on financial risk and firm performance focused on the banking sector (Dimitropoulos *et al.*, 2010; Al-Khouri, 2011; Ruziqa, 2013; Abdallah *et al.*, 2014) with few of them focusing on SMEs (Noor and Abdalla, 2014), thus creating a research gap a case for the food processing sector. Noor and Abdalla (2014) argued that SMEs are exposed to various financial risks including exchange rate risk, liquidity risk, interest rate risk, credit risk, the market risk with inconsistent influence on firm performance. In the case of food-processing SMEs in developing countries they depend largely on imported tools and technology, hence the tendency for their performance to be negatively affected by exchange rate risks. Jones *et al.* (2018) suggest technology-focused entrepreneurship development around major cities in Africa to foster their success. A study by Boermans and Willebrands (2011) found a significant negative effect of financial risk on profit levels. The finding was supported by Tafri *et al.* (2009), Dimitropoulos *et al.* (2010), Qin and Pastory (2012). Van Greuning and Bratanovic (2009) asserted that liquidity risk poses serious threats to SMEs' performance levels, thus are negatively correlated. Yusuf and Dansu (2013) also examined the relationship between business risk and sustainability of SMEs using Chi-square. They discovered that business risks affect performance levels. However, Chi-square is highly sensitive to sample size. Thus as sample size increases, absolute difference reduces and become a smaller percentage of the expected value. The reverse occurs when the sample size decreases. This situation tends to affect the predictive power of the model.

A study by Abeyrathna and Kalainathan (2016) examined the relationship between financial risk and SMEs' performance in the Anuradhapura district. Focusing on 30 purposively sampled SMEs from 5,000 registered SMEs, the study found no significant relationship between financial risk and performance. However, the question is whether the sample size was representative of the population selected. Similarly, Ombworo (2014) investigated the effect of liquidity risk on performance (profitability) of SMEs in Kenya. Using the descriptive research design while adopting both descriptive and quantitative analytical tools, the study found a positive but no significant effect of liquidity risk on SMEs' performance. Noor and Abdalla (2014) found financial risks impact on financial performance, although the direction of the effect was not indicated. Offiong, Udoka, and Bassey (2019) found a negative but insignificant relationship between financial risk and SMEs' performance in Nigeria. However, they found liquidity risk, exchange rate risk, inflation and interest risks to significantly but negatively influence SMEs' performance levels. Moyi (2019) discovered that lending to small businesses does not affect credit and insolvency risk in lending institutions. This is because there may be several factors that could lead to the insolvency of a lending institution such as governance, macroeconomic factors including regulations (Lindsay and Butt, 2020; Huhtilainen, 2020).

It could, therefore, be deduced that previous studies on SMEs have revealed inconsistent findings with some revealing significant relationships (Boermans and Willebrands, 2011; Tafri *et al.*, 2009; Qin and Pastory, 2012; Yusuf and Danso, 2013), whereas others (Ombworo, 2014; Abeyrathna and Kalainathan, 2016; Offiong *et al.*, 2019) found no significant relationships between financial risk and SME's performance. Studies including Christopoulos and Barratt (2016), Betáková *et al.* (2014), Mentel *et al.* (2016) and Oláh *et al.* (2019) found financial risks impact on firm performance. However, they did not indicate the direction of the effect. Özbuğday *et al.* (2019) are among studies that highlight SMEs' performance and compliance. They submit that compliance with environmental standards through resource efficiency investments can serve as a quality strategy for an SME to increase its sales. Meanwhile, Liu (2020) suggests that it is essential for firms to have adequate financial resources to implement proactive environmental programs. Other studies, such as Jones *et al.* (2018), cite the need for technology-focused entrepreneurship to boost entrepreneurial activity. This suggests the critical role of technology and technology risks in the survival of SMEs. These inconsistencies presented research gap for further investigation into this phenomenon, particularly food processing industry with huge economic potential for the economy of Ghana.

An interesting debate in the literature is the impact of social responsiveness on the performance of SMEs. Boutin-Dufresne and Savaria (2004) observed the adoption of corporate social responsibility codes of conduct could reduce the overall business risk of a firm, and even increase its long-term risk-adjusted-performance. Kölbel *et al.* (2017) concluded corporate social irresponsibility exposes the firm to financial risk via media coverage. It could be deduced from the extant studies three key issues required attention. These included the lack of consensus on the effect of financial risks on firm performance; the lesser attention of previous studies on the food processing sector; and inadequate literature on financial risks and firm performance in SMEs in Ghana. Besides, the paper employs the two-stage PLS-SEM hierarchy construct modeling in its analysis, different from previous studies. The study, therefore, addresses these gaps by examining the effect of financial risk on the performance of SMEs in the fruit processing sector in Ghana.

Research methods

The study employed a quantitative explanatory approach. The population consisted of small firms in the food processing sector. In a preliminary exploratory study, over 2000 of such firms were identified in the selected cities. The source of data for this part included Association of Ghana Industries (AGI), National Board for Small Scale Industries (NBSSI) and other databases. The basic criteria for inclusion were that the firm should be registered and fall into SMEs as defined by the Ghana Statistical Service. A sample size of 214 was selected using the Bartlett *et al.* (2001) sample size determination formula. However, through the application of the Nyquist sampling theorem, a sample size of 224 was used (Nyquist, 2002). As Nyquist suggests, sampling up to twice the minimum original size helps avoid aliasing, helping to obtain enough samples to capture the spatial or temporal variations in data.

The sampling procedure followed a three-step process. First was the creation of the sampling frame from the identified databases (AGI, NBSSI etc.) from the selected cities. This gave a total of 2000 firms. The cities were selected based on their qualification as major industrial hubs in the country. Second, identification numbers were assigned to the businesses obtained from the database of food processors. MS Excel was, then, used to generate and select a randomized sample of respondents based on the identification number assigned to the business. The databases used in the participant selection contained the details of the businesses that were used to reach out to the owner/managers. One reason why food processing businesses locate in the urban centers is access to market and infrastructure compared to the rural areas. The study sought to understand how financial risk perception of managers predicts firm performance. The proxies included financial risks arising from operational, market and technology risks. The dependent variable (performance) was measured using indicators including financial performance, compliance, social and resource efficiency performance.

Data used in the study were obtained mainly from the primary source. The main instrument for data collection was the questionnaire. The questionnaire was made up of an 11-point Likert-like scale with 0 (no agreement) to 10 (high agreement). This scale permitted respondents to rate the series of questions used as the constructs (Sekaran and Bougie, 2003; Agyapong and Attram, 2019). The Likert scale has been employed in several studies to study behavior that cannot directly be measured (Willits *et al.*, 2016; Joshi *et al.*, 2015; Agyapong and Attram, 2019). Using a Likert-like scaled questionnaire, data were obtained from 214 managers of small businesses.

Measurement of variables

The study analyzed financial risks in SMEs in the food processing sector. It also examines how such risks affect their performance. The nature of risks and performance were defined and measured as follows:

Financial risks indicators

The components of the financial risks were made up of operational, market, technological, credit and liquidity risks:

Operational risks (op_risk): It is the chance of loss emanating from people, systems, procedures and external events. This was measured with constructs related to legal, compliance, reputational and people risks.

Credit risks (cr_risk): This is a measure of the uncertainty associated with debtors defaulting in payments. Among the issues considered here included credit default risk, settlement risk, concentration risk, recovery risk and credit detection risk.

Liquidity risks (li_risks): This included risks associated with inadequate liquid assets. Items considered here included asset liquidity risk, inability to meet short-term financial requirements and refinancing risks.

Market risks (mk_risk): This is looked at as the chance of loss arising from increases in interest rates, poorer liquidity conditions and a decline in credit quality. It was measured using constructs related to interest rate, currency, raw materials, end-product, current monetary policies and economic performance risks.

Technology risks (tech_risk): This was measured using constructs including risks from damages to operating systems; cost associated with acquiring technological infrastructure; exposure to cyberattacks or data breaches; telecommunication and connectivity issues and data integrity.

Performance measures

The performance was defined as the ability to create acceptable outcomes and actions (Eniola and Entebang, 2015). There were some constructs used for measuring each of the variables of performance. The proxies for performance followed the work of Selvam *et al.* (2016). Financial performance (*fperf*) constructs included an increase in profitability due to improved sales from productive activities of the firm (Henri, 2006; Nasiri, 2020). *Compliance (cperf)* constructs were the firm's preparedness and response to legislations and policies regulating the food processing sector. Furthermore, the *social performance (sperf)* was the firm's response to social and community needs. This includes the firm's contribution to community development and support. The *resource efficiency (reperf*) was operationalized as how efficiently the firm uses resources. This has to do with its sustainability practices.

Data analysis

Data collected was analyzed within the partial least squares' structural equation modeling (PLS-SEM) framework backed by the stakeholder theory. This method integrates complex path models with latent variables. It combines the features of factor analysis and multiple regressions that help examine the relationship between endogenous and exogenous variables (Bagozzi and Fornell, 1982; Genfen and Straub, 2000; Hair *et al.*, 2006; Hair *et al.*, 2017b, c; Agyapong and Attram, 2019). This technique is appropriate where studies are limited by non-normal data and small sample size. It is used in nominal, ordinal and interval scales of measurements. It supports formative measured constructs (Hulland, 1999). It permits the mixing of categorical, discrete and continuous variables (Civelek, 2018). Babin *et al.* (2008) positioned that the PLS-SEM uses confirmatory approach (hypothesis-testing) to examining structural theory in any given situation.

Rönkkö and Evermann (2013) added that PLS-SEM is a complex technique capable of analyzing relationships between/among constructs under study. According to Hair *et al.* (2017b, c), this technique has more powerful and rigorous statistical processes to handle complex models. It was, therefore, relevant for analyzing studies of this nature. It is to note that the study's analysis of its five models was based on this analytical technique. The models were used to predict the relationship between the variables:

Model 1: financial risk and performance using the higher-order constructs.

Model 2: compliance performance predicted by financial, social and resource efficiency.

Model 3: financial performance explained by compliance, social, and resource efficiency.

Model 4: compliance, financial and resource efficiency explain social performance.

Model 5: effect of compliance, financial and social performance elements on resource efficiency.

An exploratory factor analysis was performed to uncover the underlying structure of the financial risk variables. In the process of conducting the analysis, there was a need to examine the appropriateness of the dataset. This was done by employing the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test for sphericity (Table 1). The KMO test revealed an adequacy value of 0.897 which was higher than the minimum benchmark value of 0.7 (Pallant, 2011). Also, Bartlett's test for sphericity ($\chi^2 = 7700.437$; df $= 1{,}378$) had a p-value which was less than the 0.01 benchmark value, meaning the responses of the respondents revealed an unidentical correlation matrix. The outcomes of these two tests validate the use of the exploratory factor analysis (Pallant, 2011).

The total variance explained in Table 2 showed that 25 components of the extracted risk factors were reduced to six components with 76.14% as its cumulative variance explained of the total variance. These six components came as a result of the benchmark eigenvalue of 1,

Table 1.
KMO and Bartlett's test

Kaiser–Meyer–Olkin measure of sampling adequacy		0.881
Bartlett's test of sphericity	Approx. Chi-Square	3678.114
	Df	300
	Sig	0.000

Component	Total	Initial eigenvalues % of variance	Cumulative %	Extraction sums of squared loadings Total	% of variance	Cumulative %
1	9.894	39.576	39.576	9.894	39.576	39.576
2	3.623	14.491	54.067	3.623	14.491	54.067
3	2.087	8.350	62.417	2.087	8.350	62.417
4	1.194	4.777	67.194	1.194	4.777	67.194
5	1.151	4.605	71.799	1.151	4.605	71.799
6	1.084	4.336	76.135	1.084	4.336	76.135
7	0.807	3.229	79.364			
8	0.686	2.742	82.106			
9	0.506	2.024	84.130			
10	0.449	1.795	85.925			
11	0.436	1.744	87.669			
12	0.380	1.519	89.188			
13	0.348	1.391	90.579			
14	0.337	1.349	91.928			
15	0.306	1.222	93.150			
16	0.292	1.169	94.319			
17	0.216	0.864	95.183			
18	0.204	0.817	96.000			
19	0.195	0.781	96.781			
20	0.176	0.704	97.484			
21	0.158	0.633	98.117			
22	0.154	0.617	98.734			
23	0.119	0.475	99.209			
24	0.102	0.408	99.617			
25	0.096	0.383	100.000			

Note(s): Extraction Method: Principal Component Analysis

Table 2. Total variance explained

meaning components with eigenvalues less than this benchmark were dropped. Also, a scree plot was plotted that confirms this outcome (see Appendix 4).

The rotated component matrix serves as a technique for retaining factors which are rotated to establish a simple structure. The rule of thumb was that factors with factor loadings greater than 0.4 were retained. The Varimax rotation was employed because the variables were uncorrelated. Factors with higher factor loadings were regarded to have a greater contribution. Even though 6 components were built, 4 out of the 6 were market risk factors (MR) and the last two were operational risk (OR) and technical risk (TR). This is seen in Table A1 (Appendix 1).

For the performance measures, the KMO test revealed an adequacy value of 0.897 which was higher than the minimum benchmark value of 0.7 (Pallant, 2011). Also, Bartlett's test for sphericity ($\chi^2 = 7700.437$; df = 1,378) had a p-value which was less than the 0.01 benchmark value, meaning the responses of the respondents revealed an unidentical correlation matrix. The outcomes of these two tests validate the use of the exploratory factor analysis (Pallant, 2011) (see Table 3).

The total variance explained Table 4 showed that 53 components of the extracted performance factors were reduced to 8 components with 74.04% as its cumulative variance

Kaiser–Meyer–Olkin measure of sampling adequacy		0.897
Bartlett's test of sphericity	Approx. Chi-Square	7700.437
	df	1,378
	Sig	0.000

Table 3. KMO and Bartlett's test

Component	Initial eigenvalues Total	% of variance	Cumulative %	Extraction sums of squared loadings Total	% of variance	Cumulative %
1	18.602	35.099	35.099	18.602	35.099	35.099
2	8.913	16.817	51.915	8.913	16.817	51.915
3	3.574	6.743	58.658	3.574	6.743	58.658
4	2.677	5.050	63.708	2.677	5.050	63.708
5	1.671	3.153	66.862	1.671	3.153	66.862
6	1.529	2.885	69.747	1.529	2.885	69.747
7	1.209	2.281	72.028	1.209	2.281	72.028
8	1.067	2.014	74.042	1.067	2.014	74.042
9	0.982	1.852	75.894			
10	0.957	1.805	77.700			
11	0.838	1.581	79.281			
12	0.789	1.488	80.769			
13	0.760	1.434	82.204			
14	0.735	1.387	83.591			
15	0.573	1.082	84.672			
16	0.554	1.046	85.718			
17	0.542	1.023	86.742			
18	0.531	1.003	87.744			
19	0.483	0.911	88.656			
20	0.438	0.826	89.481			
21	0.413	0.779	90.261			
22	0.371	0.700	90.960			
23	0.343	0.647	91.607			
24	0.335	0.632	92.239			
25	0.309	0.582	92.821			
26	0.289	0.545	93.367			
27	0.282	0.533	93.899			
28	0.253	0.478	94.377			
29	0.235	0.444	94.821			
30	0.228	0.431	95.252			
31	0.220	0.416	95.667			
32	0.198	0.375	96.042			
33	0.197	0.373	96.415			
34	0.177	0.335	96.749			
35	0.159	0.300	97.049			
36	0.154	0.291	97.340			
37	0.140	0.265	97.605			
38	0.135	0.254	97.859			
39	0.125	0.235	98.094			
40	0.120	0.227	98.321			
41	0.110	0.207	98.528			
42	0.093	0.175	98.703			
43	0.086	0.163	98.866			
44	0.079	0.148	99.014			
45	0.076	0.143	99.158			
46	0.074	0.140	99.298			
47	0.070	0.131	99.429			
48	0.065	0.123	99.552			
49	0.062	0.118	99.670			
50	0.053	0.100	99.770			
51	0.050	0.094	99.863			
52	0.042	0.079	99.943			
53	0.030	0.057	100.000			

Note(s): Extraction Method: Principal Component Analysis

Table 4.
Total variance explained

explained of the total variance. These eight components came as a result of the benchmark eigenvalue of 1, meaning components with eigenvalues less than this benchmark were dropped. Also, a scree plot was plotted that confirms this outcome (see Appendix 5).

The rotated component matrix serves as a technique for retaining factors which are rotated to establish a simple structure. The rule of thumb was that factors with factor loadings greater than 0.4 were retained. The Varimax rotation was employed because the variables were uncorrelated. Factors with higher factor loadings were regarded to have a greater contribution. Even though eight components were built, four out of the eight were financial performance factors (FP); two were social performance factors (SP) and the remaining two (4) were CP, resource efficiency performance (REP) (Table A2 – Appendix 2).

Model 1

The financial risk was modeled to reflect three main attributes in the context of this study including market risk, operational risk and technology risk. Each of these separate risks was also measured with a set of indicators. Accordingly, financial risk was modeled as a second-order construct while market risk, operational risk and technology risk were measured as the first-order construct. The reason for such an approach was in line with Polites *et al.* (2012) and Hair *et al.* (2017b, c), who mentioned that broader constructs help to capture all possible measures in the construct's domain and also higher-order constructs helps to reduce the number of relationships to achieve model parsimony.

From a measurement theory perspective, *op_risk, cr_risk, li_risks, mk_risk*, and *tech_risk* can be considered as reflections of financial risk (Cabedo and Tirado, 2004; Deng, 2020; Yang, 2020), thereby implying the use of a reflective-reflective higher-order construct, since each of the lower-order components is measured reflectively. In the following, the estimation of the higher-order constructs is illustrated using the (extended) repeated indicators approach. The assessment of the lower-order components draws on the standard reliability and validity criteria for reflective measurement models as documented in Hair *et al.* (2017a), Latan and Noonan (2017) and Sarstedt *et al.* (2017). The results in Table 5 show the measures of *mkt_risk* yield satisfactory levels of convergent validity in terms of average variance extracted (AVE = 0.619) and internal consistency reliability (composite reliability ρC = 0.942; Cronbach's alpha = 0.931; ρA = 0.933). Similarly, the measures of *op_risk* exhibit convergent validity (AVE = 0.627) and internal consistency reliability (composite reliability ρC = 0.870; Cronbach's alpha = 0.800; ρA = 0.810). Also, the measures of *tech_risk* exhibit convergent validity (AVE = 0.656) and internal consistency reliability (composite reliability ρC = 0.904; Cronbach's alpha = 0.873; ρA = 0.923).

Finally, the lower-order components' discriminant validity is achieved, because all HTMT values are below the conservative threshold of 0.85 (Table 6) (Franke and Sarstedt, 2019;

Variables	Cronbach's alpha	rho_*A*	Composite reliability	Average variance extracted (AVE)
cperf	0.896	0.994	0.909	0.626
fperf	0.963	0.968	0.966	0.599
*fin_risk**	0.928	0.941	0.937	0.395
mkt risk	0.931	0.933	0.942	0.619
op_risk	0.800	0.810	0.870	0.627
rReperf	0.798	0.813	0.879	0.707
sperf	0.919	1.062	0.928	0.617
tech_risk	0.873	0.923	0.904	0.656

Note(s): **fin_risk* is a second-order construct

Table 5. Construct reliability and validity for model 1

Henseler *et al.*, 2015; Voorhees *et al.*, 2016). However, the discriminant validity between *mkt_risk, op_risk,* and *tech_risk* and their higher-order component *fin-risk* is not considered. A violation of discriminant validity between these constructs is expected because the measurement model of the higher-order component repeats the indicators of its two lower-order components.

Besides, the repeated indicators of the *fin_risk* construct were only included for identification, and design did not stem from a unidimensional domain. This, not only means discriminant validity assessment for these relationships was not relevant, but all other types of reliability and validity assessment of the *fin_risk* construct on the grounds of the nineteen items were not meaningful.

The reliability and validity assessment of the higher-order construct *fin_risk* draws on its relationship with its lower-order components. The constructs *mkt_risk*, *op_risk* and *tech_risk* were specifically interpreted as if they were indicators of the *fin_risk* construct. As a consequence, the (reflective) relationships between the *construct* and its lower-order components *mkt_risk, op_risk,* and *tech_risk* were interpreted as loadings although they appeared as path coefficients in the path model. The analyses produced loadings of 0.938 for *mkt_risk,* 0.854 for *op_risk and* 0.370 for *tech_risk,* thereby providing support for indicator reliability. By using these indicator loadings and the correlation between the constructs as input, the relevant statistics for assessing the higher-order construct's reliability and validity were manually calculated. The AVE was the mean of the higher-order construct's squared loadings for the relationships between the lower-order components and the higher-order component:

$$\text{AVE} = \frac{\sum_{i=1}^{M} l_i^2}{M}$$

where l_i represents the loading of the lower-order component i of a specific higher-order construct measured with M lower-order components ($i = 1, \ldots M$). For this study, the AVE was 0.57828 (Appendix 3), which was clearly above the 0.5 threshold, therefore, indicating convergent validity for *fin_risk* (Sarstedt *et al.*, 2017).

The composite reliability was defined as

$$\rho c = \frac{\left(\sum_{i=1}^{M} l_i\right)^2}{\left(\sum_{i=1}^{M} l_i\right)^2 + \sum_{i=1}^{M} \text{var}(e_i)}$$

where e_i is the measurement error of the lower-order component i, and var(e_i) denotes the

Variables	*cperf*	*fperf*	*fin_risk*	*mkt risk*	*op_risk*	*reperf*	*sperf*	*tech_risk*
cperf								
fperf	0.393							
fin_risk†	0.340	0.445						
mkt risk	0.144	0.357	–					
op_risk	0.142	0.338	–	0.845				
reperf	0.151	0.543	0.395	0.438	0.383			
sperf	0.887	0.320	0.327	0.145	0.153	0.202		
tech_risk	0.725	0.329	–	0.188	0.312	0.144	0.658	

Note(s): *Fin_Risk*† is a second-order construct

Table 6. Heterotrait-Monotrait Ratio (HTMT) for model 1

variance of the measurement error, which was defined as $1-l_i^2$. Entering the two loading values yielded 0.788 (Appendix 3).

The statistics relevant for manually computing the higher-order construct's HTMT values. The higher-order construct's average heterotrait–heteromethod correlation with *cperf* was the average cross-loading of the *cperf* indicators with the *mkt_risk, op_risk*, and *tech_risk* constructs, which was 0.206, *sperf* was 0.192, *fperf* was 0.239 and *reperf* was 0.169 (Appendix 3).

In the next step, all monotrait–heteromethod correlations that were relevant for assessing the higher-order construct were computed. Since *cperf* was a ten-item construct, its average monotrait–heteromethod correlation was by definition 0.631. The eight items of *sperf* had item correlations, its average monotrait-heteromethod correlation was 0.586. Nineteen items of *fperf* had an average monotrait-heteromethod correlation of 0.576. The three items of *reperf* had an item correlation of 0.569 (Appendix 3).

The average monotrait–heteromethod correlation of the *fin_risk* construct was equal to the construct correlation among *mkt_risk, op_risk*, and *tech_risk*, which was 0.398. Finally, the quotient of the heterotrait–heteromethod correlations and the geometric mean of the average monotrait–heteromethod correlations was computed.

$$\text{HTMT}\ (\mathit{fin\_risk}, \mathit{cperf}) = \frac{0.206}{\sqrt[2]{(0.398*631}} = 0.411$$

$$\text{HTMT}\ (\mathit{fin\_risk}, \mathit{sperf}) = \frac{0.192}{\sqrt[2]{(0.398*0.586}} = 0.398$$

$$\text{HTMT}\ (\mathit{fin\_risk}, \mathit{fperf}) = \frac{0.239}{\sqrt[2]{(0.398*576}} = 0.499$$

$$\text{HTMT}\ (\mathit{fin\_risk}, \mathit{reperf}) = \frac{0.169}{\sqrt[2]{(0.398*569}} = 0.355$$

All values were lower than the conservative threshold of 0.85, thereby providing clear evidence for the higher-order construct's reliability and validity. Furthermore, the structural model (Figure 1) was analyzed by using bootstrapping with 5,000 subsamples (no sign changes) and it was found that all structural model relationships were significant ($p < 0.05$; Table 7). The construct *fin_risk* had the strongest effect on *fperf* (0.422). The effect of *fin_risk* on *reperf* (0.321), *fin_risk* on *sperf* (0.227) and *fin_risk* on *cperf* (0.218) were, in comparison, notably smaller. The R^2 values of all the dependent latent variables (i.e. *cperf*: 0.048, *sperf*: 0.052; *fperf*: 0.178; *reperf*: 0.103) were relatively low (Table 8).

The same holds for the blindfolding-based Q^2 values, all of which were larger than zero (Table 8). Finally, f^2 values were small independent variables *cperf, sperf and reperf* as compared to the moderate effect in *fperf* (Cohen, 1988) (see Table 9).

Model measurement for models 2, 3, 4 and 5

To ascertain the validity and reliability of the results, diagnostic tests were carried out as suggested by Hair *et al.* (2014a, b). The tests included internal consistency reliability (i.e. indicator and construct reliability tests) and construct validity were measured using convergent and discriminant validity. A multicollinearity test was conducted among the exogenous variables. The results were presented based on the study models. The paper followed the approach used in Wong (2019) and Hair Jr *et al.* (2017b, c) by conducting internal consistency reliability tests using the indicator and construct reliability tests respectively.

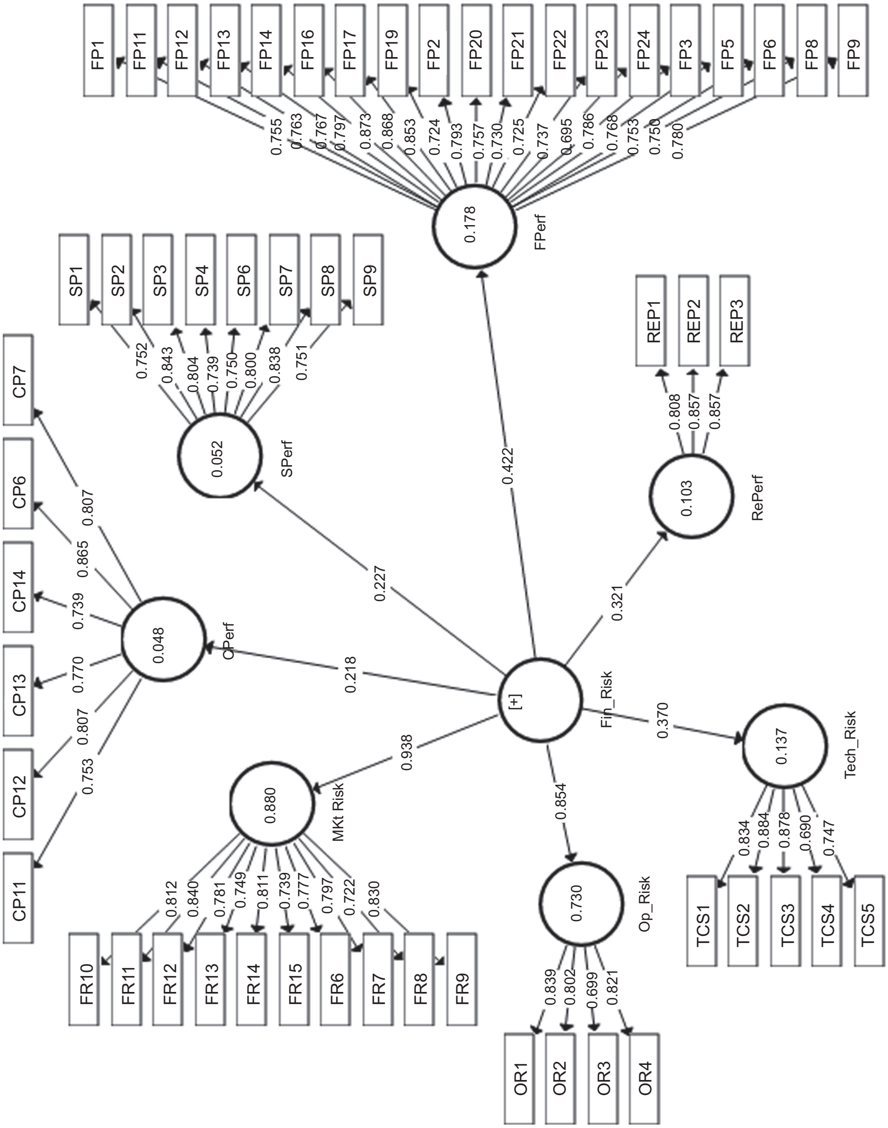

Figure 1.
Structural model one

According to Wong (2019), indicator reliability is a rigorous tool for examining the unidimensionality of a set of scale items. This test was analyzed based on rho_*A* (ρ) result. The rho_*A* (ρ) provides a better measure of indicator reliability as compared to the use of Cronbach alpha (α) (Hair *et al.*, 2014a, b; Henseler *et al.*, 2016). Chin (2010) proposed that rho_*A* (ρ) scores should be > 0.70. Table 10 presented the results of models (2, 3, 4, and 5) indicator and construct reliability.

Variables	Original sample (*O*)	Sample mean (*M*)	Standard Deviation (STDEV)	*T* statistics (|*O*/STDEV|)	*p*-value
fin_risk→cperf	0.218	0.248	0.061	3.579	0.000
fin_risk→fperf	0.422	0.434	0.064	6.586	0.000
fin_risk→mkt risk	0.938	0.939	0.014	66.613	0.000
fin_risk→op_risk	0.854	0.855	0.025	34.006	0.000
fin_risk→reperf	0.321	0.334	0.080	4.006	0.000
fin_risk→sperf	0.227	0.262	0.059	3.874	0.000
fin_risk→tech_risk	0.370	0.378	0.079	4.680	0.000

Note(s): *fin_risk*† is a second-order construct

Table 7. Coefficients and *p*-values

Variables	R^2	R^2	Q^2(=1−SSE/SSO)
cperf	0.048	0.043	0.019
fperf	0.178	0.174	0.092
reperf	0.103	0.099	0.059
sperf	0.052	0.047	0.017

Table 8. *R*-squared and *Q*-squared values

Variables	*cperf*	*fperf*	*fin_risk*	*reperf*	*sperf*
cperf					
fperf					
fin_risk	0.050	0.217		0.115	0.054
reperf					
sperf					

Note(s): *fin_risk*† is a second-order construct

Table 9. *F*- squared

Items	Model 2 rho_*A*	Model 2 CR	Model 3 rho_*A*	Model 3 CR	Model 4 rho_*A*	Model 4 CR	Model 5 rho_*A*	Model 5 CR
cperf	0.919	0.920	0.907	0.918	0.922	0.920	0.859	0.881
fperf	0.978	0.965	0.967	0.966	0.984	0.965	0.970	0.965
reperf	0.920	0.942	0.830	0.883	0.861	0.881	0.895	0.948
sperf	0.925	0.934	0.931	0.933	0.924	0.934	0.856	0.920

Note(s): IR (CA and rho_*A*) – Indicator reliability; CR – Construct reliability

Table 10. Assessment of indicator and construct reliability

It could be deduced from Table 10 that the indicator reliability was achieved in all the models since the rho_*A* (ρ) scores of each of their respective constructs met the expected criteria. More precisely, the rho_*A* scores for the constructs in Model 2 ranged from 0.919 to 0.978. Also, the rho_*A* scores for the constructs in Model 3 ranged from 0.830 to 0.967; Model 4's rho_*A* scores for its constructs ranged from 0.861 to 0.984 and finally, Model 5's rho_*A* scores for its constructs ranged from 0.856 to 0.970. In terms of construct reliability which is relevant for assessing the extent to which a given construct is well measured by its indicators when combined, the result was obtained based on the composite reliability results (Bagozzi and Yi, 1988; Ringle *et al.*, 2012). These scholars suggested composite reliability is met when its scores are $\geq$ 0.70; meeting this criterion implies that all the assigned indicators are relevant in analyzing a given construct.

From Table 10, all the various indicators in their associated models had strong mutual relationships with their respective constructs. In Model 2, for instance, the construct reliability scores of Model 2's indicators ranged from 0.920 to 0.965; Model 3's constructs had construct reliability ranging from 0.883 to 0.966; Model 4's constructs had construct reliability ranging from 0.881 to 0.965 and finally, Model 5's constructs had construct reliability ranging from 0.881 to 0.965. It could be deduced that all the indicators measuring each construct in all the models were relevant.

Convergent and discriminant validity

Following Hair *et al.* (2010, 2011), Rouibah *et al.* (2011), the test of convergent and discriminant validity was performed. Convergent validity considers the degree to which items measuring the same concept agree; discriminant measures the degree to which particular construct differs from the other constructs in the model (Hasan *et al.*, 2012). Convergent validity relies on the AVE values of all the variables used in the SEM model. Fornell and Larcker (1981) recommended that a construct shows convergent validity if its AVE is less than 0.50. Thus, the AVE scores of each construct should be $\geq$ 0.50 to show that the measurement scale was convergent. The AVE scores of all the models' constructs were presented in Table 11.

From Table 11, it could be seen that convergent validity was achieved in each of the study's models. This is because all the AVEs met the criteria recommended by Fornell and Larcker (1981). Model 2, for instance, had AVE scores between 0.596 and 0.890; Model 3 had AVE scores between 0.597 and 0.719; Model 4 had AVE scores between 0.594 and 0.713 and finally, Model 5 had AVE scores between 0.557 and 0.901. These AVE scores in each model > 0.5 thus indicating convergent validity.

According to Hasan *et al.* (2012), discriminant validity explains how each construct is different from the others in the model. The test is to examine the cross-loadings of the indicators (Hair *et al.*, 2011). Discriminant validity was reported using the Heterotrait-Monotrait (HTMT) ratio suggested by Sarstedt *et al.* (2014). According to Sarsdedt *et al.* (2014), HTMT ratio has the strength of detecting the absence of discriminant validity in common research scenarios as against the commonly used Fornell-Larcker criterion and

Table 11. Assessment of convergent validity

Items	Model 2 AVE	Model 3 AVE	Model 4 AVE	Model 5 AVE
cperf	0.661	0.652	0.661	0.557
fperf	0.596	0.597	0.594	0.596
reperf	0.890	0.719	0.713	0.901
sperf	0.639	0.636	0.640	0.591

Note(s): AVE (Average Variance Extracted) – Convergent validity cross-loadings criteria. The rule of thumb is that all HTMT values, which shows the correlation values among the latent variables, should be < 0.85 (Wetzels *et al.*, 2009). The HTMT ratio for all the Models was reported in Tables 12–15.

From Tables 12–15, it could be deduced that all the values for each of the constructs in all the models were below HTMT$^{.85}$. These indicate each construct under each model was distinct from the other.

Test of multicollinearity

The test of multicollinearity among the exogenous variables of the four models was checked using the inner variable inflation factor (VIF) values. According to Hair *et al.* (2014a, b), multicollinearity test is carried out to ensure that the study's path coefficients are free from bias coupled with reducing the significant levels of collinearity among the predictor's constructs. The rule of thumb is that VIF values should be < 5 to indicate the development of

	cperf	*fperf*	*reperf*	*sperf*
cperf				
fperf	0.393			
reperf	0.159	0.499		
sperf	0.807	0.320	0.183	

Table 12. Heterotrait-Monotrait (HTMT) ratio (Model 2)

	cperf	*fperf*	*reperf*	*sperf*
cperf				
fperf	0.393			
reperf	0.151	0.543		
sperf	0.807	0.320	0.202	

Table 13. Heterotrait-Monotrait (HTMT) ratio (Model 3)

	cperf	*fperf*	*reperf*	*sperf*
cperf				
fperf	0.393			
reperf	0.151	0.543		
sperf	0.807	0.320	0.202	

Table 14. Heterotrait-Monotrait (HTMT) ratio (Model 4)

	cperf	*fperf*	*reperf*	*sperf*
cperf				
fperf	0.393			
reperf	0.159	0.499		
sperf	0.807	0.320	0.183	

Table 15. Heterotrait-Monotrait (HTMT) ratio (Model 5)

a good PLS-SEM model (Hair *et al.*, 2014a, b). The results of the models' inner VIF scores were presented in Table 16.

From Table 16, the inner values of the predictor's constructs in Model 2 were less than the recommended value of 5; with the values ranging from 1.123 (*sperf*) and 1.385 (*fperf*). This indicated an absence of multicollinearity between the exogenous variables in Model 2. Also, in Model 3, the inner VIF values of the predictor's constructs were 2.634 (*cperf*), 1.026 (*reperf*), and 2.663 (*sperf*) < 5 indicating the absence of multicollinearity between the Model's exogenous variables. The inner VIF values of the predictor's constructs in Model 4 were 1.179 (*cperf*), 1.471(*fperf*), and 1.270 (*reperf*) < 5 which indicated the absence of multicollinearity among the exogenous variables. Finally, the inner VIF values of the predictor's constructs in Model 5 were 1.815 (*cperf*), 1.183 (*fperf*) and 1.686 (*sperf*) < 5. These inner VIF values clearly showed the absence of multicollinearity among the exogenous variables in the Models. The ensuing sections presented the results and discussion of the model's results.

Test of structural model predictive accuracy

The coefficient of determination (R^2 value) was used to compute the structural model's predictive accuracy; calculated as the squared correlation between a specific endogenous construct's actual and predicted values (Hair *et al.*, 2014a, b). The R^2 gives us the combined effect of independent variables on the dependent variable, i.e. it represents the amount of variance in the endogenous constructs explained by all of the exogenous constructs linked to it (Hair *et al.*, 2014a, b). The R^2 value of *cperf* (dependent variable) was 0.705, i.e. the combined effect of all the independent variables can cause a 70.5% variation in *cperf* (dependent variable) for Model 2. For Model 3, R^2 value obtained for *fperf* was 36.6%. In Model 4 and 5, R^2 values obtained for *sperf* (dependent variable) and *reperf* (dependent variable) were 69.8 and 25.4% respectively. Hence, one can conclude that the explanatory power of the model of this study was quite high (see Table 17).

According to Cohen (1988), f^2 values of 0.02, 0.15, and 0.35, respectively represent small, medium, and large effect of the exogenous latent variable. It was observed the effect size of variables in Model 2 ranged from small effect (<0.15) to large effect (>0.35), in Model 3 effect size ranged from small (<0.15) to moderate (<0.35), in Model 4, the effect size was large (>0.35) and finally, in Model 5, the effect size was moderate (<0.35) (see Table 18).

Variables	Model 2 *cperf*	Model 3 *fperf*	Model 4 *sperf*	Model 5 *reperf*
cperf		2.634	1.179	1.815
fperf	1.385		1.471	1.183
reperf	1.258	1.026	1.270	
sperf	1.123	2.663		1.686

Table 16.
Inner VIF values

Variables	R^2	Adjusted R^2
cperf (Model 2)	0.705	0.701
fperf (Model 3)	0.366	0.357
sperf (Model 4)	0.698	0.693
reperf (Model 5)	0.254	0.244

Table 17.
R^2 and adjusted R^2

While the R^2 values denote predictive accuracy the predictive relevance Q^2 indicates the model's predictive relevance which is called Stone–Geisser's Q^2 value (Geisser, 1974; Stone, 1974). The Q^2 values larger than zero for certain reflective endogenous latent variables indicate the path model's predictive relevance for the construct (Hair *et al.*, 2014a, b). The Q^2 values were greater than zero as shown in Table 19 which indicates the path model's predictive relevance was high.

The research models proposes a total of 12 hypotheses for predicting the various dependent variables (*cperf* in Model 2 – Figure 2, *fperf* in Model 3 - Figure 3, *sperf* in Model 4 - Figure 4 and *reperf* in Model 5 - Figure 5), First three hypotheses were tested and two had direct relations from independent variables like *fperf* and *sperf* with *cperf*, i.e. the dependent variable. Running the PLS algorithm and bootstrapping calculations in SmartPLS software provided the path coefficient of these relations which denotes the strength of the relationships and *p*-value for verifying whether the relationship is statistically significant (see Table 20).

Furthermore, models 4 and 5 are shown in Figures 4 and 5 respectively.

It was found that *fperf*→*cperf* and *sperf*→*cperf* were statistically significant while *reperf*→*cperf* was not. The direct influence of *fperf and sperf on the cperf* for the study were significant. The influence of *sperf* had the maximum value (0.791), followed by *fperf* (0.145). The influence of *reperf on cperf* was not significant. With FPerf as the dependent variable (model 2), both *cperf and reperf* the relationship between the variables were statistically significant. The test of relationship resulted in 0.391 and 0.463 for *cperf* and *reperf* respectively. In model 4, the only *cperf* had a statistically significant relationship with SPerf (0.829). Model 5 had one statistically significant relationship. FPerf had an effect of 0.459 on *reperf*.

Results and discussion

In model one, the objective was to analyze the effect of financial risks on the performance of the food processing firms in the selected cities. From the results, it was deduced that increased financial risks lead to increased financial performance. Financial risks cause firms to be more creative and innovative in their processes and procedures, hence leading to efficiency and ultimately increase financial performance. In periods of financial uncertainty, decision-makers try to explore all available options in order not to be wasteful. The resultant effect is that they tend to be prudent in the management of funds and ultimately improved upon their

f-Square	*cperf* (Model 2)	*fperf* (Model 3)	*sperf* (Model 4)	*reperf* (Model 5)
cperf		0.092	1.927	0.001
fperf	0.052		0.000	0.237
reperf	0.011	0.329	0.019	
sperf	1.892	0.002		0.004

Table 18. *f*-Squared

Q^2	Model 2	Model 3	Model 4	Model 5
cperf	0.430			
fperf		0.180		
reperf				0.209
sperf			0.410	

Table 19. *Q*-squared values

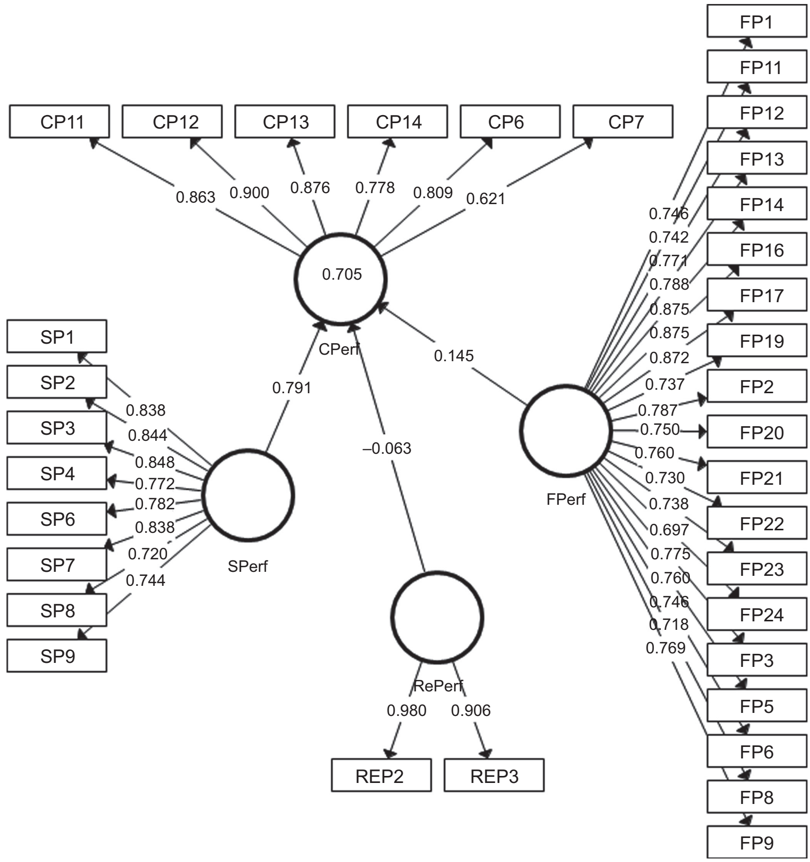

Figure 2.
Structural model two

financial performance. Noor and Abdalla (2014) found financial risks impacts on financial performance. Christopoulos and Barratt (2016), Mentel *et al.* (2016), and Oláh *et al.* (2019) found financial risks impact on firm performance. Similarly, it was found that resource performance increases as financial risk increases. Financial risks compel firms to be cautious about resource utilization. Perceived financial risks oblige firms to employ strategies to cut down waste and employ operational processes that are efficient, productive, and profitable. Özbuğday *et al.* (2019) also concluded there is a positive and significant relationship between resource efficiency venture performances.

Higher financial risk could render a firm's product and process obsolete and ultimately make it uncompetitive. Accordingly, firms respond to such situations with increasing social and corporate responsibilities. This enables them to maintain their reputation and social support. The aim is to win favor from their communities or markets. Boutin-Dufresne and Savaria (2004) concluded that CSR contributes positively to a firm's long-term risk-adjusted-performance. Kölbel *et al.* (2017) found that corporate social irresponsibility creates a financial risk for a business. Meanwhile, it was observed that increased financial risks lead to increased compliance with regulations. The sector is heavily regulated and firms are expected to comply with all operational requirements. Failure to comply with regulations could result in sanctions by the regulator, which could compound the financial risk exposure of the business.

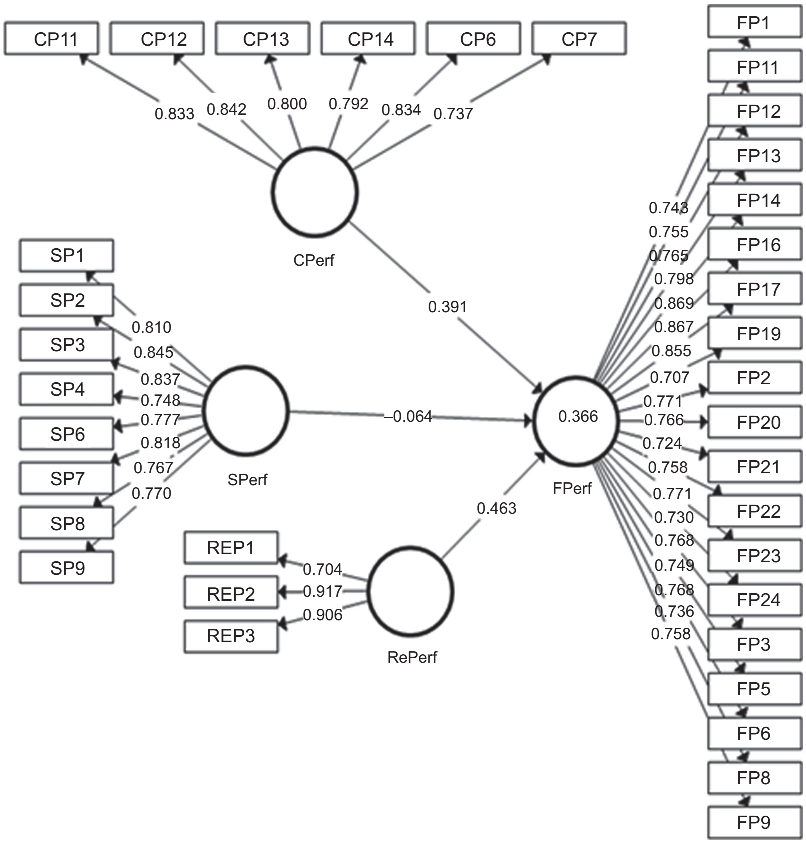

Figure 3.
Structural model three

Therefore, owners/managers would be extra careful not to attract any sanction or negative publicity by the regulators in times of rising financial risks. This could lead to a reduction in customer share, sales, profitability, and bring about competitive disadvantage. As Özbuğday *et al.* (2019) submit, compliance through resource efficiency strategy could boost sales.

Next, models 2, 3, 4 and 5 sought to analyze the relationship between the performance variables. From model 2, it was observed *fperf* and *sperf* significantly influenced *cperf*. This implies that as SMEs in the food industry gain better financial standing, they can comply with various rules and regulations that concern the environment and their work operations. Also, as SMEs in the industry seek the welfare of their employees, customers, and the community in which they operate, it improves their compliance performance as well. Furthermore, in Model 3, it was found that *cperf* and *reperf* had a statistically significant relationship with *fperf*. These relationships were both positive as well. The results suggest that as SMEs in the industry comply with rules and regulations concerning the environment, labor issues and others, they gain better financial standing such as an increase in product value, higher return on investment, an increase in market share and many more. Moreover, as SMEs use their resources efficiently through re-use and recycling materials, they gain better financial standing (Özbuğday *et al.*, 2019).

The results indicate *cperf* had a statistically significant positive effect on *sperf*. This means the more an SME complies with laws, their social performance significantly improves.

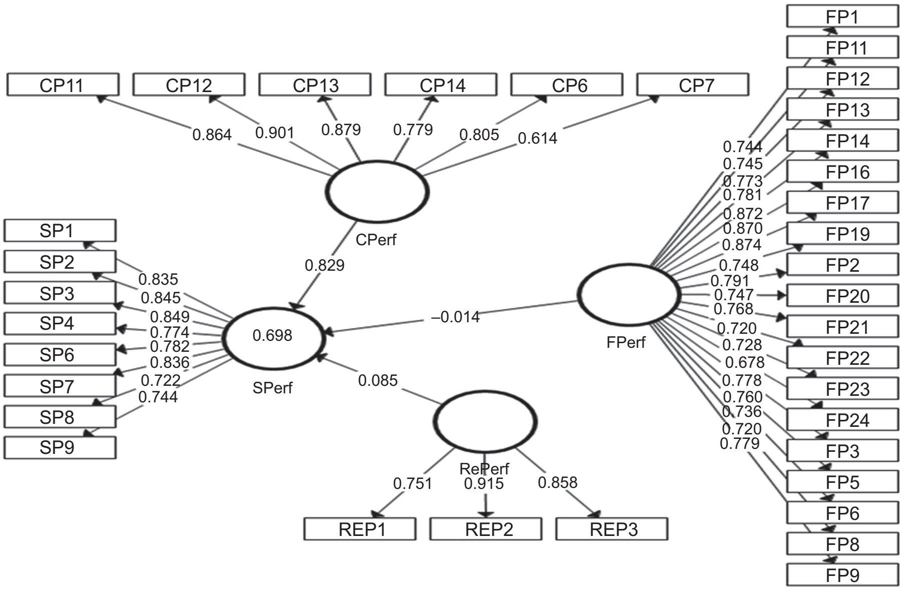

Figure 4.
Structural model four

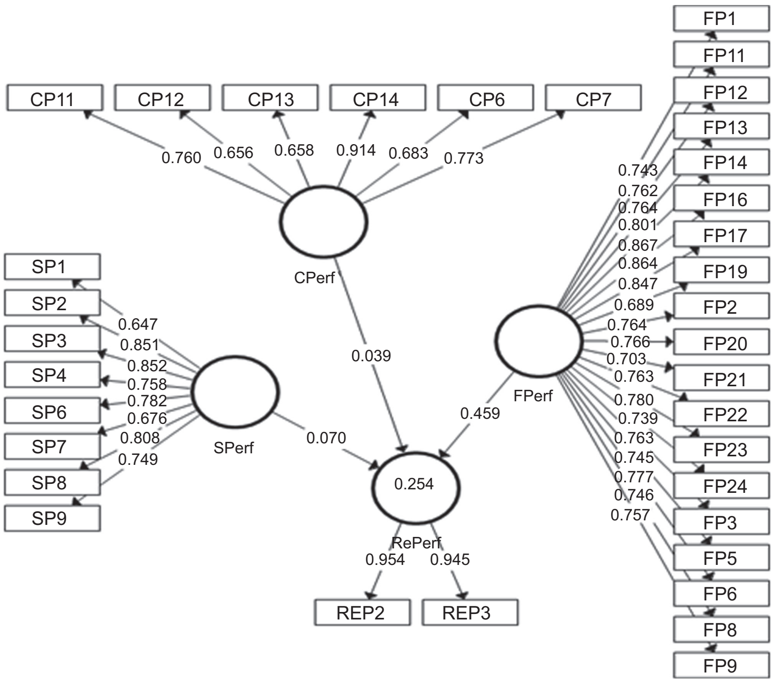

Figure 5.
Structural model five

Variables	Original Sample (*O*)	Sample mean (*M*)	Standard deviation (STDEV)	*T* statistics (|*O*/STDEV|)	*p*-value
fperf→*cperf*	0.145	0.146	0.050	2.890	0.004
reperf→*cperf*	−0.063	−0.054	0.050	1.272	0.203
sperf→*cperf*	0.791	0.792	0.029	26.982	0.000
cperf→*fperf*	0.391	0.390	0.095	4.104	0.000
reperf→*fperf*	0.463	0.461	0.060	7.763	0.000
sperf→*fperf*	−0.064	−0.049	0.092	0.694	0.488
cperf→*sperf*	0.829	0.830	0.032	26.273	0.000
fperf→*sperf*	−0.014	−0.008	0.052	0.263	0.793
reperf→*sperf*	0.085	0.087	0.053	1.594	0.111
cperf→*reperf*	0.039	0.057	0.126	0.313	0.754
fperf→*reperf*	0.459	0.452	0.079	5.816	0.000
sperf→*reperf*	0.070	0.092	0.098	0.720	0.472

Table 20.
Coefficient table

Finally, model 5 also depicts a statistically significant relationship between *fperf* and *reperf*. This suggests that an SME with good financial performance can influence its resource use efficiency. This is because reusing and recycling of materials require the right investment into the right machinery. Therefore, Liu (2020) concluded a business must have sufficient financial resources to enable them to implement efficient environmental programs.

Implications of the study

Practical implication – Firms in the food processing sector must identify and manage financial risks as they positively influence their operations. They should proactively acquire and deploy technologies that make them competitive in terms of resource use, social acceptance, and financial capability. Managers need to comply with regulations and deploy the necessary tools and techniques to operate in a resource-efficient manner since these practices have a positive relationship with financial risks. Due to the heavy regulations in the food processing sector, firms need to avoid sanctions that would ruin their reputation. It is, therefore, necessary owners/managers adopt the appropriate business strategies to reduce their risks.

Policy implication – The study revealed that financial risk was the one single variable that plays a significant role in food processing. This implies that policy initiatives and interventions that tend to minimize the elements in the SMEs' operations that tend to increase their financial risk exposure including the procedure and cost of credit, access and cost of technology and the various regulations (e.g. taxation). Policy initiatives including tax breaks, interest rate ceiling and subsidies for SMEs could promote their activities. Besides, the firm's internal policy should aim at reducing the risk exposure in their engagement with stakeholders (customers, creditors, suppliers etc.). Implementing credit policy in the business is an example of such policies. Furthermore, policy interventions should include business development services that expose food processors to different financial risks – how to identify, assess and manage these risks.

Theoretical implication – The stakeholder theory highlights the business–stakeholder interactions in the environment, focusing on the interest and power the different actors within the business space. The study points out and suggests the need to highlight the financial risks exposure of businesses as a result of the interactions. Therefore, the idea of financial risks posed by these actors as the businesses engage them should be of theoretical significance to researchers. The paper contributes to the information asymmetry theory. The findings of the study show that the issue of risks due to non-disclosure of relevant information (information asymmetry) could emanate from any of the actors in the value chain and not only from the SMEs at it has often been interpreted. For instance, both the Financial Institution and SME could contribute to the financial risk exposure of either party due to non-disclosure of relevant information resulting in adverse selection.

Implications for future research – Future research should look at extending such as analysis into other sectors including larger firms in the sector and other sectors. An issue that would be interesting investigating would be the effect of firm characteristics or even sectorial differences in predicting the financial risk–firm performance relationship.

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Appendix 1

	MR	MR	Component OR	MR	MR	TR
The firm is affected by changes in or misunderstanding of existing laws and policies related to the business			0.851			
Non-compliance with internal policies, procedures and best practices affect the firm			0.847			
Loss of good reputation due to malpractices disrupts the firm's operations			0.790			
The firm is exposed to perceived fraud arising from assets embezzlement, manipulating financial statements, corruption and bribery			0.650			
The firm incurs cost whenever its people (employee) a breakdown or suffers damages	0.756					
Defaults or delays in payment of debts by debtors disrupt the firm's cash flow	0.671					
The firm suffer losses whenever its partners fail to meet contractual obligations	0.691					
The firm is threatened by any single or a group exposure with the potential to produce a large number of losses						0.538
The firm is exposed to recovery risk whenever it fails to quickly recover from credit defaults						0.531
The firm is exposed to credit detection risk whenever it fails to detect or accurately identify all credit defaulters						0.488
The firm activities are affected by changes, fluctuations or unpredictable nature of interest rates				0.677		
Changes in the price of the currency to another affect the firm				0.714		
The firm is exposed to commodity risk due to frequent changes in prices and availability of commodities (raw materials, end product)	0.772					
The firm is exposed to monetary policy risk whenever the central bank makes changes in current monetary policies				0.737		
The firm is exposed to market risk as a result of declines in the economic performance of the economy	0.702					
Losses arising from the firm's inability to sell its assets at the required value disrupt its operations					0.793	
The firm faces funding liquidity risk due to our inability to settle bills or meet other short-term financial requirements					0.781	
The need to regularly meet unplanned capital expenditure affects the firm's operations					0.759	
The firm is exposed to seasonal fluctuations in revenue generation						0.731
Continuous rise in interest rates make it difficult for the firm to take advantage of better financing options						0.575
The firm makes losses arising from damages to operating systems		0.719				
The cost associated with acquiring technological infrastructure affects the firm's operations		0.827				
Exposure to cyberattacks or data breaches disrupts the firm's operations		0.900				
Telecommunication and connectivity issues is a risk to the firm		0.796				
The firm faces data integrity risk because the data it stores and processes are mostly incomplete, inaccurate and or inconsistent		0.832				

Table A1.
Rotated component matrix

Appendix 2

	Component							
	CP	FP	FP	SP	FP	REP	SP	FP
We have experienced increasing economic value added		0.792						
Our return on equity has been improving		0.855						
Firm's net income/revenue is increasing steadily		0.868						
Return on investment helps maintain our investors		0.761						
We have experienced increasing EBIT Margin		0.816						
The firm's management is efficient at using its assets to generate earnings		0.729						
The firm can allocate a portion of its profit to owners		0.440						
The firm experienced appreciation in its worth		0.653						
We are getting more cashback for each cedi invested		0.677						
Market fluctuations have been favorable to our firm					0.565			
The firm is experiencing increasing product value		0.609						
The firm is earning a rate higher than its replacement cost		0.585						
The firm is experiencing a rising market-share growth			0.558					
Our firm has experienced asset growth over time		0.641						
We are experiencing net revenue growth								
There is net income growth appreciation		0.593						
The number of our employees is growing		0.576						
There is a relatively lower turnover rate in our firm								0.454
We invest in employee's development and training								0.451
We have favorable wages and rewards policies			0.556					
The firm has career plans in place					0.545			
We have good organizational climate			0.745					
Our employees are generally satisfied			0.759					
Our customers are satisfied with our mix of products /services			0.775					
We receive less number of complaints			0.758					
Our products have high repurchase rate			0.757					
We have high new customer retention			0.805					
There is general customers satisfaction			0.841					
There are many new products/services launched					0.610			
We have projects to improve/recover the environment	0.628							

(*continued*)

Table A2.
Rotated component matrix

	Component							
	CP	FP	FP	SP	FP	REP	SP	FP
The firm has a low level of energy intensity (lower cost to convert energy)						0.541		
We use recyclable materials						0.733		
We reuse our residuals						0.703		
We monitor the volume of energy consumption							0.634	
The firm has not experienced any lawsuits due to its practices							0.553	
We have designed and follow our environmental policy	0.856							
The firm produces an annual environmental audit report	0.879							
There is an environmental review committee	0.863							
We work to meet the international environmental standard	0.711							
We have the local certifications and operate within them	0.596							
We publish our annual environmental audit report	0.849							
Our Board Size is comparable to that of similar firms	0.806							
Our Board is free from any form of interference	0.825							
We have directors who monitor executives to act in the interest of shareholders	0.745							
Managers have high share ownership					0.487			
There is equity in terms of the number of women and men in the firm	0.792							
We publish our reports periodically	0.822							
We employ more people from minority groups	0.620							
We have several social and cultural projects	0.660							
Our firm has not experienced any lawsuits				0.481				
We meet regulatory agencies requirement				0.733				
We engage in fair trade				0.837				
We work to reduce vulnerability in our community				0.748				

Note(s): Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
[a] Rotation converged in 10 iterations

Table A2.

Appendix 3

$$\begin{aligned} AVE &= \left(0.938^2 + 0.854^2 + 0.370^2\right)/3 \\ &= (0.8686 + 0.7293 + 0.1369)/3 \\ &= 1.7348/3 \\ &= 0.57828 \end{aligned}$$

$$\begin{aligned} \rho C &= (0.938 + 0.854 + 0.370)^2/(0.938 + 0.854 + 0.370)^2 + \left(1 - 0.938^2\right) \\ &\quad + \left(1 - 0.854^2\right) + \left(1 - 0.370^2\right) \\ &= 4.6742/4.6742 + 0.1202 + 0.2707 + 0.8631 \\ &= 4.6742/5.92814 \\ &= 0.788 \end{aligned}$$

Average heterotrait-heteromethod correlation with *cperf* was the average cross loading of the *cperf* indicators with the *mkt_risk, op_risk* and *tech_risk* constructs (Table 15), which was:

$$\begin{aligned} &= (- 0.023 + -0.004 + 0.001 + 0.045 + 0.031 + 0.176 + -0.064 + 0.019 + -0.015 \\ &\quad + 0.102 + 0.119 + 0.197 + 0.484 + 0.632 + 0.568 + 0.376 + 0.629 + 0.429)/18 \\ &= 3.702/18 \\ &= 0.206 \end{aligned}$$

In the case of *sperf*, the same statistic was given by the average cross loadings of *sperf indicators with mkt_risk, op_risk* and *tech_risk* (Table 15), which was:

$$\begin{aligned} &= (- 0.081 + 0.136 + -0.006 + 0.047 + 0.016 + 0.036 + 0.224 + -0.025 + -0.022 \\ &\quad + 0.111 + 0.026 + -0.047 + 0.101 + 0.038 + 0.219 + 0.087 + 0.530 + 0.432 + 0.401 \\ &\quad + 0.326 + 0.444 + 0.552 + 0.479 + 0.582)/24 \\ &= 4.606/24 \\ &= 0.192 \end{aligned}$$

Fperf, the same statistic was given by the average cross loadings of *Fperf* indicators with *mkt_risk, op_risk* and *tech_risk* (Table 15), which was:

$$\begin{aligned} &= (0.222 + 0.260 + 0.217 + 0.346 + 0.288 + 0.272 + 0.253 + 0.341 + 0.211 \\ &\quad + 0.430 + 0.248 + 0.261 + 0.237 + 0.215 + 0.250 + 0.222 + 0.161 + 0.295 \\ &\quad + 0.231 + 0.162 + 0.317 + 0.176 + 0.311 + 0.295 + 0.224 + 0.214 + 0.339 \\ &\quad + 0.169 + 0.353 + 0.239 + 0.209 + 0.195 + 0.204 + 0.200 + 0.168 + 0.131 \\ &\quad + 0.277 + 0.164 + 0.235 + 0.237 + 0.312 + 0.268 + 0.351 + 0.304 + 0.412 \\ &\quad + 0.384 + 0.312 + 0.185 + 0.397 + 0.161 + 0.064 + 0.118 + 0.287 + 0.239 \\ &\quad + 0.125 + 0.172 + 0.248)/57 \\ &\quad = 13.625/87 = 0.239 \end{aligned}$$

Reperf, the same statistic was given by the average cross loadings of *reperf* indicators with *mkt_risk, op_risk* and *tech_risk* (Table 15), which was:

$$\begin{aligned} &= (0.353 + 0.269 + 0.314 + 0.311 + 0.207 + 0.243 + (-0.021) + (-0.081) + (-0.076))/9 \\ &= 1.519/9 \\ &= 0.169 \end{aligned}$$

Average monotrait-heteromethod correlation for *Cperf* was by definition:

$$= 0.761 + 0.697 + 0.660 + 0.599 + 0.412 + 0.852 + 0.581 + 0.655 + 0.420 + 0.609 + 0.631 + 0.364 + 0.519 + 0.494 + 0.602)/14 = 8.830/14 = 0.631$$

The eight items of *sperf* had item correlations of

$$= 0.615 + 0.637 + 0.567 + 0.584 + 0.811 + 0.461 + 0.577 + 0.869 + 0.714 + 0.570 + 0.606 + 0.5460.482 + 0.766 + 0.593 + 0.583 + 0.475 + 0.507 + 0.493\ 0.598 + 0.462\ 0.412 + 0.622 + 0.525 + 0.613 + 0.548 + 0.519 + 0.664)/28 = 16.419/28 = 0.586$$

The nineteen items of *fperf* had item correlations of

$$= 0.604 + 0.522 + 0.606 + 0.691 + 0.606 + 0.574 + 0.428 + 0.774 + 0.373 + 0.420 + 0.487 + 0.449 + 0.491 + 0.749 + 0.689 + 0.590 + 0.578 + 0.604 + 0.739 + 0.629 + 0.654 + 0.619 + 0.572 + 0.473 + 0.622 + 0.487 + 0.426 + 0.533 + 0.479 + 0.495 + 0.587 + 0.541 + 0.544 + 0.606 + 0.602 + 0.589 + 0.631 + 0.706 + 0.659 + 0.489 + 0.591 + 0.517 + 0.544 + 0.480 + 0.465 + 0.504 + 0.591 + 0.592 + 0.582 + 0.499 + 0.598 + 0.798 + 0.777 + 0.663 + 0.483 + 0.593 + 0.544 + 0.474 + 0.590 + 0.533 + 0.583 + 0.556 + 0.500 + 0.603 + 0.572 + 0.500 + 0.829 + 0.770 + 0.575 + 0.676 + 0.542 + 0.0.591 + 0.576 + 0.579 + 0.626 + 0.655 + 0.639 + 0.622 + 0.640 + 0.665 + 0.792 + 0.553 + 0.669 + 0.586 + 0.609 + 0.588 + 0.601 + 0.590 + 0.621 + 0.670 + 0.645 + 0.598 + 0.655 + 0.674 + 0.610 + 0.638 + 0.678 + 0.622 + 0.639 + 0.546 + 0.589 + 0.577 + 0.638 + 0.570 + 0.634 + 0.487 + 0.693 + 0.770 + 0.488 + 0.516 + 0.446 + 0.461 + 0.423 + 0.355 + 0.440 + 0.528 + 0.444 + 0.537 + 0.438 + 0.441 + 0.467 + 0.778 + 0.741 + 0.586 + 0.590 + 0.684 + 0.617 + 0.661 + 0.723 + 0.596 + 0.477 + 0.469 + 0.547 + 0.532 + 0.498 + 0.582 + 0.548 + 0.437 + 0.479 + 0.494 + 0.398 + 0.392 + 0.534 + 0.794 + 0.610 + 0.503 + 0.387 + 0.565 + 0.454 + 0.393 + 0.661 + 0.462 + 0.448 + 0.573 + 0.524 + 0.482 + 0.445 + 0.443 + 0.573 + 0.524 + 0.482 + 0.445 + 0.443 + 0.573 + 0.454 + 0.402 + 0.787 + 0.661 + 0.593 + 0.677 + 0.661 + 0.641 + 0.725 + 0.639 + 0.565 + 0.731)/171 = 98.578/171 = 0.576$$

The three items of *reperf* had item correlations of

$$= 0.459 + 0.444 + 0.803)/3 = 1.706/3 = 0.569$$

Appendix 4

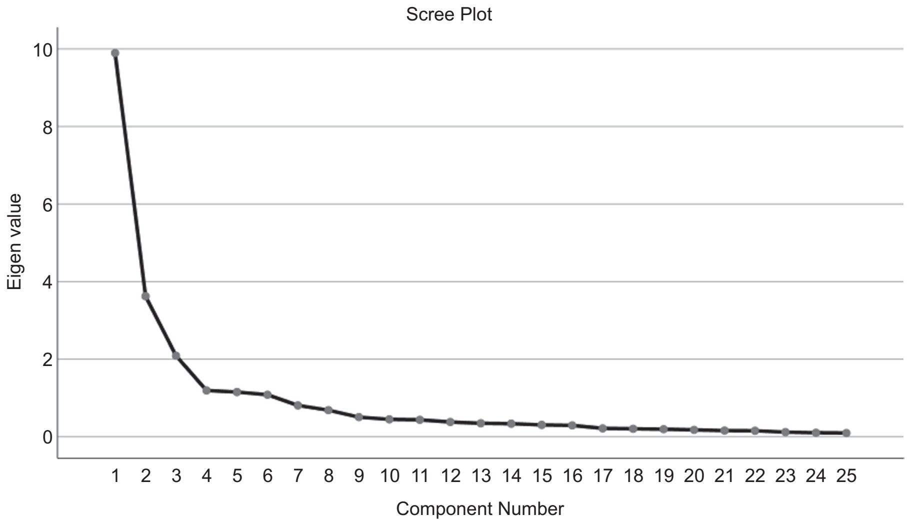

Figure A1.
Scree plot for risk

Appendix 5

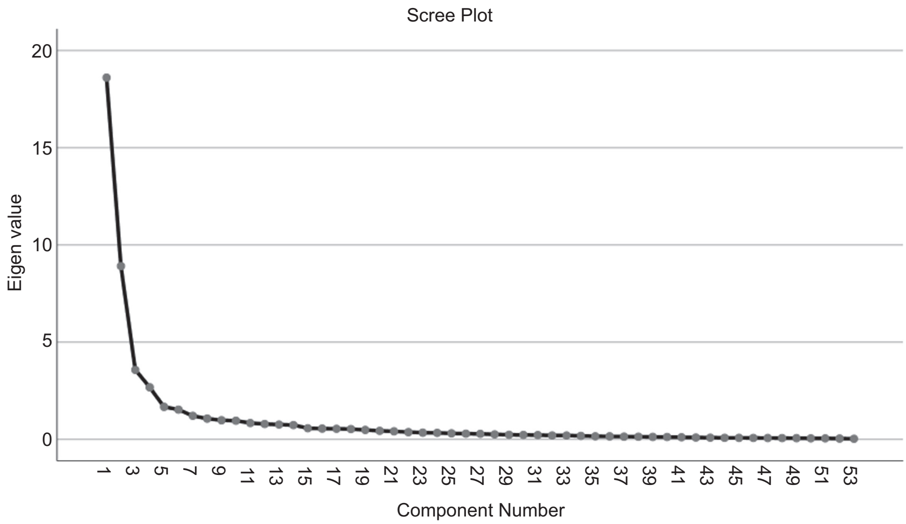

Figure A2.
Scree plot for performance

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