A Preliminary Study on the Relationship between Financial Literacy and Business Performance among Entrepreneurs in Bauchi Metropolis, Nigeria

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Abstract

Entrepreneurs are the backbone of all prosperous economies worldwide, since they are regarded as a key driver of economic growth in creating job opportunities, eradicating poverty and leading to the production of both developed and emerging countries' gross domestic product (GDP). This paper presents the findings of a pilot survey aimed at validating a questionnaire explicitly designed to gather data on the relationship between financial literacy and business performance among entrepreneurs. A total of 37 sampled respondents were used in the analysis using a stratified and clear random sampling technique. The data were analyzed with the assistance of the Statistical Kit for Social Sciences (SPSS) version 23, of which the study of the variables and assessment of the reliability were carried out. As a result, only 44 of the 49 elements that initially formed the survey were retained. A total of 9 components emerged from the data that were named in accordance with their underlying constructs. The factor loadings reported met the appropriate threshold of .50. The reliability of the items and the respective scales was also within the acceptable range of .70. It was thus concluded that the questionnaire was reliable and could be used for the reason for which it was built.

Keywords
Factor analysis; pilot study, principal component analysis, reliability, validity

1. Introduction
Financial literacy is a combination of understanding, information, expertise, behaviors and actions that is necessary to complete financial choices and ultimately to promote individual financial well-being (Lusardi and Mitchell 2013). In business financial literacy, is considered to be the degree to which one understands important financial concepts and has the capacity and confidence to manage the funds of appropriate, short-term decision-making and sound long-term financial forethought (Remund 2010). Entrepreneurial financial literacy is therefore essential in enabling an entrepreneur to make successful decisions on the use of financial capital over a lifetime and to interact effectively with financial products and services (Wise 2013).

It is understood that the financially literate entrepreneur has an understanding of simple principles such as investing, accounting and certain economic concepts such as inflation and exchange rates (Lewis and Lindley 2015). Financial literacy education provides a person with the opportunity to identify business opportunities, awareness, self-esteem and skills, while enhancing his or her business efficiency (ACCA 2014). Financial literacy also provides young entrepreneurs the opportunity to access sources of finance, and access to financial services encourages their business sustainability and development (Vincent 2014).

The positive outcome of being financially literate is determined by actions, e.g. managing spending and building insurance, whereas unquestionable activities, such as extreme use of credit, can affect the financial well-being of individuals (Peng et al. 2015). In addition, financial conduct is understood by economic and non-economic values maintained by the decision-maker as a consequence of such actions, and is thus considered to be a central factor in the personal decision-making process (Potrich et al. 2015). Financial literacy help Entrepreneurial financial planning skill, as regard to record-keeping, risk management and budgeting (Annamaria and Olivia 2014). Entrepreneurial financial literacy improves the opportunity for business gains with improved operating capacity and business performance (Adomako & Danso 2014).

1.1 An Overview on Exploratory Factor Analysis (EFA)

Factor analysis is usually conducted in order to determine the principal constructs or dimensions in the dataset (Mohammed et al. 2018). Whereas reliability analysis is generally used in measuring the performance of the construct. The exploratory factor analysis (EFA) was piloted following the five steps guide as clarified by Williams et al. (2010). These phases consist of a set of iterative procedures related to each other, including data suitability evaluation for exploratory factor analysis (EFA) which is known as sampling adequacy calculation and includes data suitability for factor analysis, factor extraction process, factor retention process, rotation method selection, data interpretation and labelling (Jolliffe 2002). Ensuring sampling adequacy is one of the important steps in exploratory factor analysis (EFA).

There are arguments as to what constitutes an appropriate sample size while exploratory factor analysis (EFA) is used to be an analytical tool, as some studies use a minimal number of case requirements, while some are susceptible to cases using a variable ratio criterion (Beavers et al. 2013). In the case of the minimum number of cases criterion, several rules of thumbs had been advanced Williams et al. (2010) considered 100 cases as poor, 200 as fair, 300 cases as good, 500 cases as very good and 1000 cases and above as excellent sample sizes in exploratory factor analysis (EFA). Costello and Osborne (2005) argued that in conducting an exploratory factor analysis (EFA) the number of observations must be more than the number of variables and that a sample size of 50 is considered adequate.

In regards to the cases to items criterion, authors had proposed the ratios of 20:1; 10:1; 5:1; 3:1 rule of thumbs as the suitable ratio for exploratory factor analysis (EFA) (Costello and Osborne 2005). Though, the ratio criterion had been criticized many times (Beavers et al. 2013). Instead, Saunders et al. (2016) suggested that the required sample size determining in exploratory factor analysis (EFA) should be based upon the strength of the relationship between the factors and the items. Based on this argument, they operationalized the relationship as factors having four items or above with loadings of 0.60 or higher; then the size of the sample is not applicable, factors having 10 to 12 items that moderately loads .40 or above, therefore a sample size of 150 or above is required while factors that are defined by few variables and have moderate to low loadings, a sample size of at least 300 is desirable.

Supporting this argument, Costello and Osborne (2005) indicated that with a sample as low as 50 cases, a stable solution can be obtained when three or four items have higher loadings of .70 and above. Thus, being a pilot survey, a total number of 37 samples were used for this analysis. This number meets the recommended minimum sample size advanced by Costello and Osborne (2005).

Having established the factorability of the data set, the next step in the factor analytical process is to find out the factor extraction method. Factor extraction encompasses the task of choosing the most appropriate factor analysis method from series of alternative methods, in order to ensure the selection of an optimal method that explains the dataset considerably. There are diverse factor extraction methods from which a researcher can select when conducting factor analysis: principal component analysis (PCA); principal axis factoring (PAF); maximum likelihood (ML); Image factoring etc. with each method having its own uniqueness and requirements.

The PCA and the PAF were identified as the most generally used methods among all the methods (Williams et al. 2010). Though, there are arguments whether PCA is a factor analysis technique or not. For instance, Finney (2007) argued that PCA is a merely a data reduction technique and it is not appropriate when the aim of the analysis is to observe structure or pattern within a given dataset. Conversely, PAF is considered the suitable factor analysis technique when the aim is to observe the underlying latent constructs from numerous variables. However, others believed that the results of the two come together (Pallant 2011). In this aspect it was recommended that the researcher should apply both methods so that a better result that most perfectly portrays research aim is chosen (Jolliffe 2002).

The preliminary extraction of factors in factor analysis shows results with as many factors as the number of variables in the dataset. Nevertheless, only a few factors would be considered for retention for further analysis and interpretation. Various criteria have been developed to guide the researcher while making the decision about the number of factors to be retained from factor analysis (Fabrigar et al. 1999). Researchers have numerous options once making decision on the number of factors to be retained which comprises of Kaiser Criterion, scree plot test, variance extracted, or parallel analysis criterion (Williams et al. 2010).

The Kaiser Criterion has been known as the most widely method used among researchers, it comprises computing the eigenvalues for the correlation matrix of the dataset to determine how many of these eigenvalues are greater than 1, which is then used as the cut off point for the number of factors to be retained (Beavers et al. 2013). Though, this method has been criticized of being too arbitrary and it is inclined to over factoring or under factoring as the case may be (Mohammed et al. 2018). In addition, the scree plot test encompasses plotting a graph of the eigenvalues and then examining it to identify the point at which the bend breaks or flattens out, the number of factors retained is generally determined by the number of data points that occurred above the break point (Field 2012). Nevertheless, highlighting the breakpoint that determines the number of extracted factors has been criticized of being subjective (Yong and Pearce 2013 and Costello and Osborne 2005). Nonetheless, with the presence of strong common factor, the scree plot test is considered to functions well (Yong and Pearce 2013). Another method of determining number of factors to retain is variance extracted method, this criterion involves retaining factors that explains certain percent of extracted variance (Pallant 2011).

The decision rule for acceptable percentage benchmark is, nevertheless, a subject of debate among researchers. Whereas some suggested as low as 50 percent explained variance as acceptable, others argued that the variance explained should be 75 percent and above (Williams et al. 2010). The parallel analysis method is considered the most appropriate method to decide the number of factors to retain in factor analysis (Fabrigar 1999). The procedure involves comparing the actual eigenvalues obtained from the working data with the eigenvalues expected from a completely random sample, the decision rule is to retain the factors whose eigenvalue is greater than the eigenvalues expected from the random data (Yilmaz 2013). However, this method was also criticized as being arbitrary in the choice of the factors as any factor with eigenvalue that falls marginally below the expected eigenvalue is not considered, in order to avoid bias in the factor retention decision, the use of multiple criteria was encouraged (Williams et al. 1996 and Mohammed et al. 2018).

The next step in the factor analytic procedure is the choice of rotation method. The main aim of rotation in factor analysis is to simplify and clarify the structure of the data (Williams et al. 2010). There are diverse types of rotation that can be executed in factor analysis which broadly categorized into two: orthogonal rotation and oblique rotation. The orthogonal rotation comprises of varimax, equamax and quartimax, it is used when no correlation among factors is assumed while the oblique rotation consist of direct oblimin, quartimin and promax, it is used when the researcher assumes correlation among the factors (Finney 2007). The last step in the factor analysis process is the interpretation and labelling of the retained factors which process includes assigning name for a given factor so as to reflect its theoretical or conceptual meaning that is intended to convey (Williams et al. 2010).

2. Methodology

The indicators that measured the nine (9) constructs were generated through literature review to suit the context of the present study. The questionnaire was designed in a Likert-scale type rating scale. This scale type is chosen because it provides ordinal level measures of multiple indicator measurements of psychological and behavioral concepts which provide greater flexibility for data analysis (Mohammed et al. 2018). The questionnaire contained a total of 49 items measuring the nine constructs.

The questionnaire assessed the intensity and direction of respondents' agreement or disagreement with series of statements that measure. Access to credit (AC), Financial awareness (FA)' Debt Management (DM); Book keeping (BK), Saving (SV), Risk Management (RM), Diversification (D), Saving (S) and Employee Competency on a five-point "strongly disagree" (1) to "strongly agree" (5) scale. The questionnaire was self-administered to 37 entrepreneurs at four major markets in Bauchi metropolis Nigeria using the simple random sampling strategy. All questionnaires were retrieved and used for the analysis. The collected data was analysed using the Statistical Package for Social Science (SPSS) version 23.

3. Result and Discussion

3.1 Data Suitability for Exploratory Factor Analysis

The suitability of the dataset for Exploratory Factor Analysis (EFA) was assessed by examining suitability of the dataset for EFA was assessed by examining the correlation matrix of the variables, the Kaiser-Mayer-Olkin (KMO) Measures of Sampling Adequacy and the Bartlett's Test of Sphericity as recommended by (Williams et al. 2010). The decision rule applied in assessing the correlation matrix is to examine the determinant. A non-zero determinant indicates that, at least, a factor can be extracted from the dataset (Pallant 2011). On the other hand, best practice

among researchers recommends the KMO value to be > .50 while the Bartlett's Test statistic should be < .05 (Beavers et al. 2013).

3.2 Factor Extraction and Rotation Method

The extraction follows an iterative procedure where the analysis was conducted 12 times before arriving at a simple solution. The process was conducted using the PCA method with orthogonal rotation (varimax) rotation option. The choice of this method was informed by the fact that the fore most aim of conducting the factor analysis is to identify the underlying constructs that best represent the original variables in the dataset. Identifying the latent constructs will provide a manageable representative data without considerably losing the inherent features of the original data.

PCA is considered the suitable factor analysis technique when the aim is to observe the underlying latent constructs from given number of variables (Yong and Pearce 2013). Other specifications involve the suppression of factor loadings to .50 such that only variables that load .50 or higher would appear in the output. This was based on the recommendation of Williams et al. (2010) who suggested that factor loadings can be suppressed to as high as .50. A total number of 5 variables that either substantially cross loaded or were freestanding (not loading on any factor) were removed from the analysis. Table 1 shows the 9 extracted factors that resulted from the analysis.

3.3 Factor Retention Criteria

Multiple criteria were used in order to decide the number of factors to be retained in the present analysis. This is to ensure the retention of "optimum" number of factors. By using multiple criteria, the risk of considerable data loss because of under factoring was hopefully avoided. In the same way, the risk of including extraneous factors as a result of over factoring was likely avoided too. Factor retention decision was based on the Kaiser Criterion and the percentage of total variance explain.

The Kaiser Criterion was used to determine the number of factors to retain. The total eigenvalue for the factors were all above 1 which is the Kaiser's benchmark for factor retention. Strictly following the Kaiser Criterion, 9 factors were retained. However, Jolliffe (2002) cited in (Mohammed et al. 2018) criticized the Kaiser Criterion as being too strict and suggested that factors with eigenvalue as low as .70 should also be retained. Following this argument, 9 factors were retained based on the Kaiser criterion.

Therefore, considering relationship mentioned above, this is an exploratory study that aimed at detecting the structure of the data and refining a questionnaire that would be used in the full scale study, 9 factors were retained as indicated by the previous methods. This is to avoid the issue of losing essential information which might be required in the final research study.

Table 1: KMO and Variance Explained

Construct	Items	Factor loadings	KMO	Total Variance Explained
Access to Credit	AC1 AC2 AC4 AC5	.853 .528 .821 .881	.715	61.42
Financial Awareness	FA2 FA2 FA3 FA5	.779 .828 .573 .796	.736	73.502
Debt Management	DM1 DM2 DM3 DM5	.958 .958 .769 .717	.715	73.502
Book Keeping	BK2 BK3 BK4 BK5	.897 .797 .723 .723	.669	62.104

Table 1: KMO and Variance Explained (continued)

Construct	Items	Factor loadings	KMO	Total Variance Explained
Saving	SVI	.915	.835	70.025
	SV2	.905		
	SV3	.883		
	SV4	.793		
	SV5	.661		
Risk Management	RM1	.889	.882	79.735
	RM2	.879		
	RM3	.932		
	RM4	.886		
	RM5	.877		
Diversification	D1	.936	.864	83.177
	D2	.849		
	D3	.925		
	D4	.930		
	D5	.917		
Sales	S1	.909	.878	82.482
	S2	.913		
	S3	.933		
	S4	.868		
	S5	.869		
	S6	.954		
Employees Competency	EC1	.909	.876	79.916
	EC2	.897		
	EC3	.930		
	EC4	.862		
	EC5	.869		
	EC6	.954		
	EC7	.830		

3.4 Interpretation and Labelling of Factors

The last step in the factor analytical process is the interpretation and labelling the retained factors. The process involves assigning name for the given factor to reflect its theoretical or conceptual meaning it is intended to convey (Williams et al. 2010). The questionnaire items and their loadings on the extracted factors is discussed as follows; the items that load highly on factor 9 were statements that express respondents' agreement to employ competent employees in their business so as to enhance their performance labelled "Employee Competency (EC)". Six items loaded highly on factor 8. The questions associated with these items asked the respondents to indicate their agreement with the importance of sales in relation to their business performance. As shown in the table all the five items related to saving behaviour highly loaded in factor 5, therefore was labelled as "Saving (SV)".

Factor 6 has five items that loaded highly on it, the items relates to a question that asked the respondents to indicate their attitudes regarding risk management. Factor 7 has five items related to diversification labelled as "Diversification (D)". With regards to factor 1, the four items that loaded highly on it formed part of the question that measured the respondents' agreement about the availability of accessible credit facility. All the four items tend to portray access to credit facility as crucial, therefore the factor was labelled "Access to Credit (AC)". Factor 2 the items highly loaded on four factors that are trying to measure the respondents' financial literacy awareness about the financial products and services and was labelled (FA)".

Factor 3 items loaded on four items the statements reflects respondents' knowledge with respect to debt management. Therefore, the factor was labelled "Debt Management (DM)". Factor 4 the items load on 4 items, the statement tried to measure the respondents' book keeping behaviour. The factor was conveniently labelled "Book Keeping (BK)".

3.5 Reliability analysis

It is recommended that, upon identifying the underlying the structure of the data through the exploratory factor analysis (EFA), a reliability analysis should be conducted on the items and their respective constructs in order to examine and establish the validity of the questionnaire scales (Saunders et al. 2016). In this section the reliability of the constructs was tested using the Cronbach's Alpha method. The acceptable threshold for scale reliability is .70 and above although .60 is also regarded as acceptable when the study is at its exploratory stage. Table 2 show the result of the reliability analysis. The reported Scale's Cronbach's Alphas indicated that all the scales are reliable. Table 2 show the result of the reliability analysis. The reported Scale's Cronbach's Alpha indicated that all the scales are reliable as they all meet up the threshold. The Sales sub-scale reported the highest alpha value (α = .956).

The next highest alpha values are associated with the Employees competency (α = .954), Diversification (α = .947), and Risk Management (α = .934). The reported alpha values of the remaining five scales also satisfy the recommended threshold of .70 with the lowest reported alpha value associated with Book keeping constructs respectively. Thus, it could be concluded that the scales are reliable and could be used in measuring what they were intended to measure.

Table: 2 Reliability Analysis of the instrument

Construct	Items	Item Cronbach's Alpha	Scale Cronbach's Alpha
Access to Credit	AC1	.838	.851
	AC2	.860	
	AC4	.730	
	AC5	.803	
Financial Awareness	FA1	.844	.851
	FA2	.840	
	FA3	.742	
	FA5	.807	
Debt Management	DM1	.770	.873
	DM2	.770	
	DM3	.880	
	DM5	.906	
Book Keeping	BK2	.643	.787
	BK3	.724	
	BK4	.782	
	BK5	.781	
Saving	SV1	.844	.885
	SV2	.828	
	SV3	.845	
	SV4	.872	
	SV5	.898	
Risk Management	RM1	.921	.934
	RM2	.921	
	RM3	.906	
	RM4	.922	
	RM5	.923	
Diversification	D1	.928	.947
	D2	.949	
	D3	.930	
	D4	.929	
	D5	.935	

Table: 2 Reliability Analysis of the instrument (continued)

Construct	Items	Item Cronbach's Alpha	Scale Cronbach's Alpha
Sales	S1	.948	.956
	S2	.948	
	S3	.945	
	S4	.954	
	S5	.954	
	S6	.940	
Employees Competency	EC1	.944	.954
	EC2	.946	
	EC3	.944	
	EC4	.949	
	EC5	.948	
	EC6	.939	
	EC7	.956	

4. Conclusion

A Principal Component Analysis (PCA) was performed on 49 orthogonal rotation (varimax) items. The Kaiser – Meyer – Olkin test confirmed the sampling adequacy of the study, KMO = .715; .736; .715; .669; .835; .882; .864; .878 and .876. All values were above the acceptable limit of.5, which confirmed that the sample was sufficient for analysis (Williams, 2010). The Bartlett's test of sphericity χ^2 were all less than .05 ($p < .000$), indicating that correlations between items were sufficiently large for principal component analysis (PCA). An initial analysis was run to obtain eigenvalues for each component in the data. Nine components had eigenvalues over Kaiser's criterion of 1 and explained 61.42 %, 73.502 %, 73.502 %, 62.104 %,70.025 %, 79.735 %, 83.177 %, 82.482 %, 79.916 % variance in the respective factors extracted. The analyses resulted in retaining 41 items out of the 49 items that were originally included in the first draft of the questionnaire. The factor analysis result indicated that the 41 items can appropriately be clustered into 9 factors which were labelled Access to Credit, Financial Awareness, Debt Management, Book Keeping, Savings, Risk Management, Diversification, Sales and Employee Competency. The findings of reliability analysis revealed that all the scales were reliable which therefore lead to the conclusion that the questionnaire can be used to collect information from the broader population the main survey.

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