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Financial Inclusion, Community Capacity Building and Pro-Wildlife Conservation Behavior around the Northern Periphery of Dja Biosphere Reserve, Cameroon

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ABSTRACT. The study examines the contribution of financial inclusion and community capacity building on pro-wildlife conservation behavior among rural households at the Northern Periphery of Dja Biosphere Reserve, the east region of Cameroon. The data were elicited through the survey questionnaire administered on a sample of 279 households involved in the program of conservation in the areas. The study used a cluster sampling approach in grouping proximity villages into four zones and a purposive sampling technique was used in selecting the households. The objective was achieved empirically using three-stage maximum likelihood estimation techniques; factor analysis, confirmatory factor analysis and structural equation modeling. The result shows that financial inclusion and community capacity building had a significant positive effect on pro-wildlife conservation behavior. The magnitude of the effect of financial inclusion on pro-wildlife conservation behavior was even larger than the magnitude of the effect of community capacity building. The findings suggest that financial inclusion and community capacity building had the tendency to reduce the decline in wildlife stocks as it promoted friendly behavior towards wildlife and its habitats. The study, therefore, recommends policies that support financial inclusion and community capacity building that are essential for sustainable conservation since it promotes pro-wildlife conservation behavior.

Keywords*: conservation, financial inclusion, pro-wildlife, Cameroon*

JEL Classification: G20, O15, Q57

INTRODUCTION

In recent decades, lots of reforms in the area of wildlife conservation have been undertaken by most African countries. These reforms were aimed at curbing the level of species losses due to human activities. Some of the reforms are: (1) the convention of biological diversity, (2) convention on international trade in endangered species of fauna and flora, (3) the UN Food and agricultural organization on sustainable management of natural resources and ecosystem, (4) the global environmental facility (GEF), and (5) the intergovernmental science-policy platform on biodiversity and ecosystem services at the international level to mention a few. Despite these laudable efforts in the area of wildlife conservation in Africa and the world at large and Cameroon in particular, the decline in wildlife stocks still remains a major challenge (Ariya & Momanyi, 2015; Bouché et al., 2011; Ogutu et al., 2016; Scholte, 2011).

According to the global wildlife program in 2015, every day over 50 elephants, 3 rhinos, and approximately 100 thousand pangolins were slaughtered for their ivories, horns, and scales. In 2016, world wildlife crime reports indicated that pangolin was killed for its meat and scales every 5 minutes, every 26 minutes an elephant was killed in the world (UNODC, 2016). African rhinos were estimated to be poached every 8 hours. The reports further explained that in the 1960s, the

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African population of rhinos was estimated at 100 thousand while in 2016, the rhino's population was estimated at five thousand. Another report according to the Great Elephant Census, between 2007 and 2014, revealed that the population of African elephants declined (Chase, Schlossberg, Sutcliffe, & Seonyatseng, 2018).

International union of conservation of nature (IUCN) reports in 2016 attributes the loss to surge in poaching and habitat loss (Thouless et al., 2016). Some studies argued that the continuous decline in wildlife population in Africa is attributed to human actions (Ariya & Momanyi, 2015; Bouché et al., 2011; Ogutu et al., 2016; Scholte, 2011). The losses do not only destroy the ecosystems but also destroy wildlife tourism.

The traditional and protectionist approach of wildlife conservation which involved the establishment of protected areas, restriction of access and the use of natural resources in the protected areas have failed to further value the forest species and ecosystems as well as to improve on the lives of those who live around the protected areas. As it is argued that the local community initially depended on the natural resources in the protected areas where the reserve was created (Ariya & Momanyi, 2015; Epanda et al., 2019). Due to lack of support to the local people who reside around the protected areas, they have developed a retaliatory behavior in the forms of killing wildlife, poaching, and destruction of natural habitat (Seidensticker, 2010).

Based on this justification new global environmental facility (GEF) and World Bank funding, it is suggested that an incentive base is the best alternative approach in conservation practices as it can ensure proper management of protected areas. While according to Muhumuza & Balkwill (2013), the failure of the protectionist approach to further value the wildlife is because it failed to take into account the socio-economic and human dimension of biodiversity conservation. Restriction of the local people from accessing resources from the protected areas without any adequate compensation in terms of capacity building towards an alternative source of income has implications on both the livelihoods of the local community and the wildlife community. One of the implications, for instance, is that the local community cannot actively participate in the implementation of the wildlife reforms due to lack of capacity building. In addition, most of the financial resources to implement the wildlife conservation reforms are from the government, though international donors also contribute much to support the wildlife conservation activities. However, these funds are hardly enough to support the wildlife conservation efforts.

Walpole & Wilder (2008) emphasized on building human capital, natural, physical, financial, and institutional capacity as well as empowerment, security, and network development as an important tool towards achieving sustainable conservation. It is equally argued that financial support for wildlife conservation projects is very important although it is often not sufficient to meet up the targeted budget. In addition, financial support for projects is one of the important steps towards improving the livelihood outcome of households in protected areas. The importance of financial inclusion in reducing inequality of opportunities among households cannot be over emphasized. Financial inclusion is widely accepted as not only a pro-growth but also a pro-poor as it plays an important role in reducing poverty globally (Demirgüç-Kunt, Honohan & Beck, 2008).

The theory of reasons and actions (TRA) developed by Ajzen and Fishbein in 1975 assumed that humans are rational and that they respond to incentives (Ajzen & Fishbein, 1975). The TRA suggests that behavior outcomes can be predicted by examining individual attitudes about behavior and intent to perform the behavior (Fang, Ng, Wang, & Hsu, 2017). Attitudes are derived from individuals' beliefs about behavior as well as the appraisal of the advantages and disadvantages of performing the behavior. This theory suggests attitudes and behavioral intention towards wildlife conservation as possible mediators, although the testing of mediation is not the primary focus of the paper.

The study aims at examining the influence of financial inclusion and community capacity building on pro-wildlife conservation behavior among rural households at the Northern Periphery of Dja Biosphere Reserve, the east region of Cameroon.

RESEARCH METHOD

The study adopted both qualitative and quantitative research designs. As in the qualitative approach, questionnaires were used as the main tool for collecting the primary data. The study explores the extent to which financial inclusion and capacity building influence pro-wildlife conservation behavior among households at the Northern Periphery of Dja in the East Region of Cameroon. The study followed the ideology noted in the literature of Fang et al. (2017); Gandiwa, Heitkönig, Lokhorst, Prins, & Leeuwis (2013); Tagg et al., (2018) who argue that increasing environmental problems have imposed a substantial threat to environmental sustainability, and there is an urgent call for response in terms of efforts to enhance environmental friendly behavior.

Method of Sampling

The study used both cluster and purposive sampling approaches. This was because the members of the population were difficult to be reached, given that they were mostly farmers and hunters. An advantage of using purposive sampling is that it is easy and convenient to administer since it relies upon the judgment of the experts to draw the sample (Epanda et al., 2019).

Table 1. Number of Households Surveyed

Villages	Estimated number of inhabitants	Estimated Number Households	Number of Households surveyed in each village (%)
Bintsina	145	27	9(3.23)
Bitsil	346	63	16(5.73)
Djolempoum	193	35	17(6.09)
Doumo Mama	429	78	20(7.17)
Doumo Pierre	90	16	6(2.15)
Echou	413	75	9(3.23)
Ekok	179	56	35(12.54)
Kabolone II	49	42	20(7.17)
Kompia	800	145	10(3.58)
Madjuih II	155	28	9(3.23)
Malen II	90	60	24(8.60)
Malen V	129	24	16(5.73)
Mboumo	1249	227	7(2.51)
Medjoh	126	23	13(4.66)
Nemeyomg	323	59	12(4.30)
Ngoulminanga	131	43	28(10.04)
Ntoumzouk	82	24	16(5.73)
Pallisco	142	26	12(4.30)
Total	5071	1051	279(30.26)

Source: Adapted from (Epanda et al., 2019).

The inhabitants of 18 villages were divided into four zones using a cluster sampling approach. Purposive sampling was used in selecting the households. The villages in zone 1 were: Malen V and Doumo Pierre, the villages in zone 2 include Ntibonkeuh, Kabolone II, Nemeyomg, Bintsina, Medjoh, Ngoulminanga, Kompia, while the villages in zone 3 include; Madjuih II, Echou, Malen II, Bitsil, and Doumo Mama. In zone 4, Mboumo, Ekok, Djolempoum, and Pallisco Eboumrtoum were part of the sample. The total sample size for the study was 279 as observed in Table 1. The sample size was found to be appropriate following the recommendation of Schreiber et al., (2006) and Hoe (2008). Schreiber et al.,(2006) suggest that a minimum sample size of 100 for multivariate study using maximum likelihood is good. Hoe (2008) also argues that a minimum sample of 200 is good for any statistical analysis.

Model Specification

Gifford & Nilsson (2014) posit that having relevant knowledge and information about environmental issues have little effects in decision making but rather the understanding of the behavior that individuals hold is of utmost importance. The behaviors of individuals can be better understood through their attitudes, beliefs, and intentions (Ajzen & Fishbein, 1975). The causal relationships between financial inclusion, community capacity building, and pro-wildlife conservation behavior are specified using the direct and indirect effect model. The direct effect functional form is defined by:

$$PWCB = f\,(FI,\ CAPB) \tag{1}$$

Where;

PWCB is pro-wildlife conservation behavior while FI is financial inclusion, and CAPB is community capacity building. The indirect functional form is given by;

$$PWCB = f\,(FI\,(CAPB)) \tag{2}$$

Equation 1 shows the direct functional relationship between community capacity building, financial inclusion and pro-wildlife conservation behavior meanwhile equation 2 shows the effect of financial inclusion on pro-wildlife conservation behavior mediated by community capacity building. In other words, equation 2 shows that financial inclusion does not only has a direct effect on pro-wildlife conservation behavior, it also has an indirect effect through capacity building as well as through attitudes and behavior intentions. From the direct and indirect functional forms, we used the pictorial and empirical model as seen in Figure 1, equation 3 and 4.

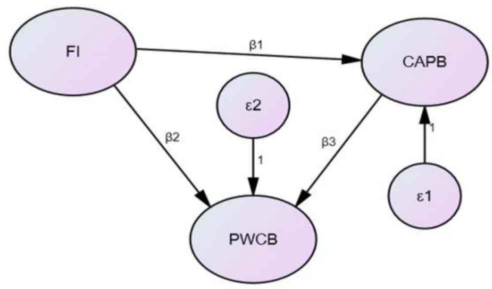

Figure 1. Hypothesized conceptual latent structure model of pro-wildlife conservation

The pictorial hypothesized specified model in Figure 1 is the shortened form of the pro-wildlife conservation since the mediators, variable attitudes and behavioral intentions are not included. The non-inclusion of attitudes and behavioral intention towards conservation is to avoid the cumbersomeness of presenting the framework at this level and when presenting the results. Figure 1 shows that the effect of financial inclusion (FI) on community capacity building is captured by the coefficient β1. The effect of community capacity building on pro-wildlife conservation is captured by the coefficient β2. The direct effect of financial inclusion on pro-wildlife conservation is captured by the coefficient β3. The parameters β1, β2, and β3 measure the extent to which one construct is related to another construct in the study. The parameters were estimated using maximum likelihood estimation technique of structural equation modelling. These parameters are technically called regression weight. The parameter ε1 measures the errors of financial inclusion in the prediction of community capacity building while ε2 is the error measurement in the prediction of pro-wildlife conservation behavior by the two constructs; financial inclusion and community capacity building. The pictorial diagram in Figure 1 shows the direct and indirect effects of financial inclusion on pro-wildlife conservation behavior. There are two types of measurement models in the structural equation model; inner and outer models. The outer measurement model shows the relationship between the constructs and the indicators. It is otherwise called the factor structure. The inner model shows the relationship between one construct in the prediction of another construct and prediction error measurement as seen in Figure 1. It is also called the latent structure model.

Direct specification of the econometric model is

$$PWCB_i = \beta_1 FI_i + \beta_3 CAPB_i + \varepsilon 2 \quad (3)$$

In this case, β2 and β3 are the parameters that measure the extent to which financial inclusion and capacity building relate to pro-wildlife conservation behavior. The subscript i represent that the observations were collected over individuals. The models are specified without intercept because the standardized value of a constant is zero. The theoretical expectations of the sign of the coefficients are; β2>0 and β3>0.

Indirect specification of the econometric model is

$$PWCB_i = \beta_2 FI_i.(\beta_3 CAPB_i + \varepsilon 1) + \varepsilon 2 \quad (4)$$

Furthermore, mathematical exposition of factor analysis is presented in the Appendix.

Statistical and Validation Analysis

The data were quantified, coded, and keyed in the software Statistical Package of Social Science (SPSS) version 23 and Amos version 21 to obtain the quantitative data and to present the model specification.

Discriminant validity (DV) captures the extent to which a construct is distinct from other constructs (Carmines, & Zeller, 1979). One of the common measures of discriminant validity is cross-loadings. The discriminant validity in the study was established comparing the square of the average variance extracted with the coefficient of correlation between the constructs. Based on Fornell & Larcker (1981) criteria, if the square of the average variance extracted is greater than the coefficient of correlation between financial inclusion and community capacity building for instance; the decision rule is that there is evidence of discriminant validity.

Convergent validity is the degree of agreement between two or more indicators of the same construct (Carmines, & Zeller, 1979). It measures the extent to which the set of items on the questionnaire actually reflects the theoretical latent (or unobserved) construct they are designed to measure. Convergent validity exists if all the loadings factor is greater than 0.5.

Construct reliability (CR) measures the level of internal consistency of the items under the constructs. The items are considered reliable if the construct reliability is 0.7 and above as recommended by Hulland (1999) and Cronbach (1951). It is, therefore, necessary to check in making sure that all the items in the questionnaire are measuring the same underlying construct and they are not error.

Skewness and Kurtosis were used to test the multivariate normality. Byrne (2013) recommends that a data normally distributed if the skewness for the various items ranges between -2 to +2 while kurtosis score ranges -7 to +7. Meanwhile, Bentler (1990) suggests a more stringent criterion of 1.96 for both skewness and kurtosis. The outliers test was performed by dividing the Mahalanobis d-squared (MAH-DS) with the number of indicators. According to Bentler (1990), if the sample size is greater than 200 and the value is greater than 4 it means that there is evidence of the potential of an outlier.

RESULT AND DISCUSSION

Respondent Profile

The survey sample consisted of 279 respondents, with the majority of males. From Table 2, it is observed that that out of the 279 respondents, 145 (52.16%) were males while 133 (47.84%) were females. The result indicates that the distribution of respondents according to gender fairly balanced. The balance of gender in the study is necessary to avoid opinions bias from responses from the two groups.

About 58.99% of the respondents were monogamy, 14.39% were single, 18.71% were polygamy, and 5.40% were widow while 2.52% were separated. The finding indicated some level of social cohesion. It is important to note that marital status was considered as indicators of stability and responsibility at the individual and community levels. 7.58% of the respondents were below 20 years of age, 32.13% was between 20 to less than 35 years, 27.44% was between 35 to less than 45 years while 17.69% and 15.16% were between 45 to less than 60 years and 60 years plus respectively.

As concerned, most of the respondent (62.95%) only attended primary school. 25.9% of the respondents were in secondary school while 8.27% did not have any formal education. Out of the total proportion of those samples in the study, less than 1% of respondents attended university or any other higher institution of learning. The finding on the level of education shows that the level of education of the respondents was very low and it is an indication that those who live around the protected areas may not be able to participate in high skilled jobs, and thus trap in low income earning cycle.

Table 2. Socio-Demographic Profile of Respondents

Variable	Number	Proportion
Gender of households' head		
Male	145	52.16
Female	133	47.84
Age (years)		
18 - <20	21	7.58
20 - <35	89	32.13
35 - <45	76	27.44
45 - <60	49	17.69
60 and above	42	15.16
Education level		
No formal education	23	8.27
Primary	175	62.95
Secondary	72	25.90
Tertiary	8	2.88
Marital status		
Single	40	14.39
Monogamy	164	58.99
Polygamy	52	18.71
Widow	15	5.40
Divorced	7	2.52
Monthly income (in thousand FCFA)		
<30	108	38.85
30 - <50	52	18.71
50 - <75	23	8.27
75 - <100	38	13.67
100 - <150	44	15.83
150– <200	1	0.36
200 and above	12	4.32
Number of household members		
<5	124	45.09
5 and above	151	54.91
Access to electricity		
Yes	13	4.68
No	265	95.32

When respondents were asked to indicate their monthly income in FCFA, more than one-third

(38.85%) of the sample population indicated that they earned less than 30 thousand frs (<$15 equivalent) per month. 12 (4.32%) people earned 200 thousand frs ($100) per month and above. The result in Table 2 corroborated to their level of education, as it was indicated that most of the respondent only attended primary school. Considering their level of education as they are mostly into farming, they may not be able to apply high technology to improve their products due to their low level of scholarship. Electricity is an indispensable source of energy for any vibrant economy in the world today. It helps the transformation of both agricultural and industrial products as well as important power support for the service sector.

Lack of electricity can be considered as an important risk factor to poverty. The result in Table 2 indicates that more than 90% of the sample population agreed that they did not have access to electricity. Those who indicated that they had access to electricity were using solar energy which was not even constant. The lack of access to electricity seemed to suggest that the cost of living around the protected areas was expensive. Lack of electricity also discouraged micro, small medium-size businesses from locating in those areas, meaning that the local people could not benefit form the expanded set of opportunities that might come with the usage of electricity.

Exploratory Factor Analysis

At the exploratory level, a measure of sample adequacy was established through the test of Kaiser-Meyer-Olkin and Bartlett's test of sphericity. The result Kaiser-Meyer-Olkin and Bartlett's test of sphericity is as seen in Table 3.

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.709
Bartlett's Test of Sphericity	Approx. Chi-Square	1073.633
	Degree of freedom	120
	Significance level	0.000

Table 3 shows the result of KMO and Bartlett's Test of Sphericity. The KMO value of 0.709 is reasonable to conduct a factor analysis. The p-value of Bartlett's test (Sig = 0.000), which is below 0.05, is significant at the 99% confidence level. This result indicates that the correlations structure is significantly strong enough to perform a factor analysis on the items. The use of factor analysis in the initial stage of data processing is to permit us to; (1) identify the underlying significant manifest indicators of the unobservable variables in the study.

Table 4. Result of Rotated Component

	Rotated Component Matrix[a]				
	CAPB	FI	PWCB	ATTW	BI
B008	0.874				
B011	0.803				
B019	0.794				
E003		0.803			
E022		0.736			
E006		0.698			
E021		0.547			
D003			0.788		
D004			0.780		
D001			0.648		
D005			0.562		
C008				0.844	
C007				0.803	
C015				0.692	
D014					0.806
D015					0.768

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
[a] Rotation converged in 5 iterations.

Table 4 shows the loading factors pertaining to various constructs. The items which are retained are greater than the cut-off criteria of 0.5 and above. Any other item that did not meet up with the minimum cut-off criteria of 0.5 loading factors (such as items with loading factor of less than 0.5, 1, or even negative value) were discarded. The loading factors are the regression weight of each indicator. The loading of an item shows the extent to which an item contributes to the factor. A value close to 1 indicates that an item loads highly on a specific factor. The result in Table 4 shows clearly that the item B008, B011, and B019 load to the factor wildlife capacity building while four items load to factor or construct financial inclusion (E003, E006, E022, and E021). The four items load under the construct pro-wildlife conservation behavior (D001, D003, D004 and D005) while three items load on attitudes (C007, C008 and C015) and two items on behavioral intention (D014 and D015). The measurement of the variables is summarized on Table 4.

The result in Table 5 shows strong evidence of internal consistency as the reliability of the factor was well above the minimum cut-off criteria of reliability coefficient of 0.5 for variables at the exploratory phase. However, the variable behavioral intention was well below the minimum cut of the criteria, although it was maintained in the study for further investigation at the confirmatory phase of the analyses of the result.

Table 5. Measurability of The Variable and Reliability Result

Construct	Item (Indicator)	Description	Dimension	Chron-bach's Alpha
Capacity Building	B008	Capacity building can enhance the skills and understanding of wildlife policies.	Skills and Ability	0.803
	B011	Wildlife conservation is a two-way traffic; it requires the collaboration of the community and the institutions such as NGOs, the government, etc.	Community involvement	
	B019	Knowledge of community needs is an important aspect of wildlife capacity building.	Psychological need fulfilment	
Financial Inclusion	E003	Placement of bank branches around the protected areas encourages savings and access to loans.	Financial Penetration	0.688
	E006	Sharing financial information improves knowledge of the usage of financial services	Knowledge of Financial services	
	E021	The cost associated with financial inclusion is too high.	Affordability of financial services	
	E022	Access to financial services is affordable.	Access to financial Services	
Attitudes towards wildlife	C007	I think sensitization on wildlife is necessary to change the perception people have towards wildlife conservation.	Cognitive Attitudes	0.705
	C008	I love wildlife because they attract tourists.	Affective attitudes	
	C015	I like working with conservation agents and tourists.	Psychomotor Attitude	
Behavioral Intention	D014	I intend to work with wildlife conservation society.	Support wildlife conservation	0.445
	D015	I am ready to abide by the rules and regulations put in place by the local community toward wildlife and its conservation.	Respect wildlife laws	
Pro-wildlife conservation behavior	D001	Wildlife is part of my family.	Empathy	0.768
	D003	I teach my children the importance of wildlife in our community and society.	Wildlife education	
	D004	It is important to discuss local folk tales that enhance wildlife conservation to my family and friends.	History of wildlife	
	D005	The local community is ready to promote wildlife conservation activities in my village.	Readiness	

Table 6. Result of The Test of Discriminant Validity

	FI	CAPB	ATT	BI	PWCB
FI	0.610				
CAPB	0.372	0.760			
ATT	-0.031	0.019	0.690		
BI	0.028	0.026	0.157	0.540	
PWCB	0.300	0.341	0.229	0.226	0.810

The result in Table 6 shows strong evidence of discriminant validity. The finding suggests that the indicators of the construct are unique. In other words, the indicators reflect only the theoretical construct being measure and not the errors or other concepts.

Table 7. Result of The Test of Convergent Validity

Constructs	Average Variance Extracted (AVE)
CAPB	0.58
ATT	0.46
BI	0.29
PWCB	0.65
FI	0.37

The average variance extracted (AVE) was significant as they were above the cut-off criteria of 0.5 recommended by (Fornell & Larcker, 1981), except for two constructs (financial inclusion and behavioral intention) (Table 7). The results reveal that there is evidence of convergence validity between the constructs in the study.

Table 8. Multivariate Normality Test

Variable	Skew	C.R.	Kurtosis	C.R.
D003	-.521	-3.550	-.866	-2.954
D004	-.562	-3.832	-.874	-2.980
C007	-.876	-5.974	-.209	-.713
C008	-.681	-4.647	-.372	-1.267
C015	-.560	-3.816	-.569	-1.941
D015	.309	2.106	-1.385	-4.721
D014	-1.503	-10.250	2.206	7.522
E022	-.906	-6.175	-.467	-1.594
E021	-.893	-6.086	-.023	-.080
E006	-1.373	-9.364	1.386	4.727
E003	-1.175	-8.016	.333	1.137
B019	-.364	-2.482	-1.000	-3.410
B011	-.716	-4.883	-.477	-1.627
B008	-.529	-3.606	-.866	-2.953
Multivariate			21.543	8.500

The result of the multivariate normality test shows that the variables in the model were normally distributed meanwhile the result of the observations farthest from the centroid (Mahalanobis distance) shows no evidence of potential outliers (Table 8).

Test of Confirmatory Factor Model

The result of the confirmatory factor analysis (Figure 2) suggests that the factor loadings fulfill the minimum cut-off criteria of 0.5 and above 0.5. The root mean square of the approximation (RMSEA) is well below the cut off criteria suggested by Byrne (2013) for a good fit. The comparative goodness of fit index (CFA), goodness of fit index (GFI) and adjusted goodness of fit index (AGFI) are both above 0.9 minimum criteria as recommended by Chau (1997) and Segars & Grover (1998). We were confident the model reproduces that data adequately. In other words, the finding of CFA analyses suggests that the data could reproduce the hypothesized model. This finding satisfied the necessary and sufficient conditions to run a full fledge structural equation model using maximum likelihood estimation technique.

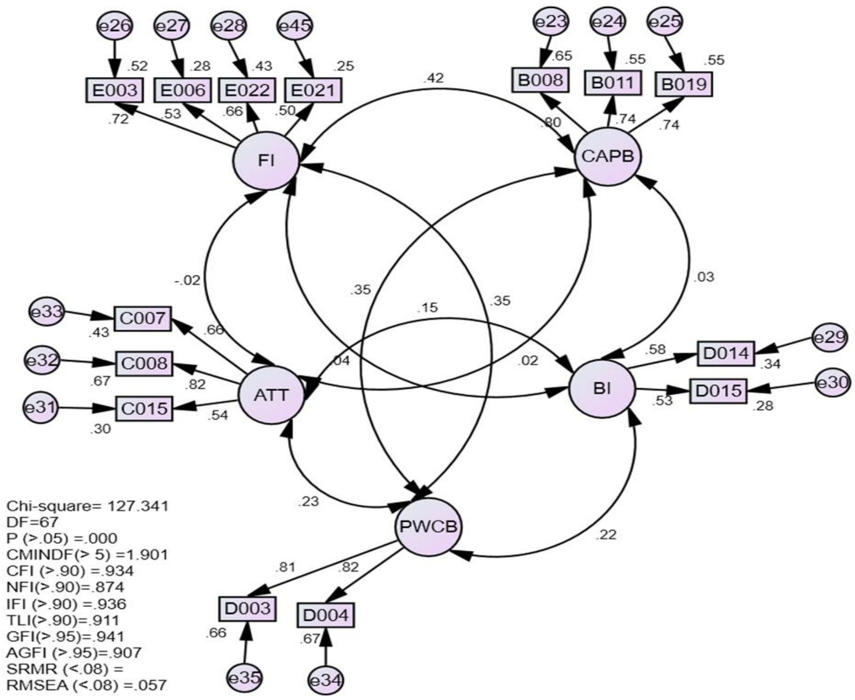

Figure 2. Confirmatory factor model of pro-wildlife conservation behavior

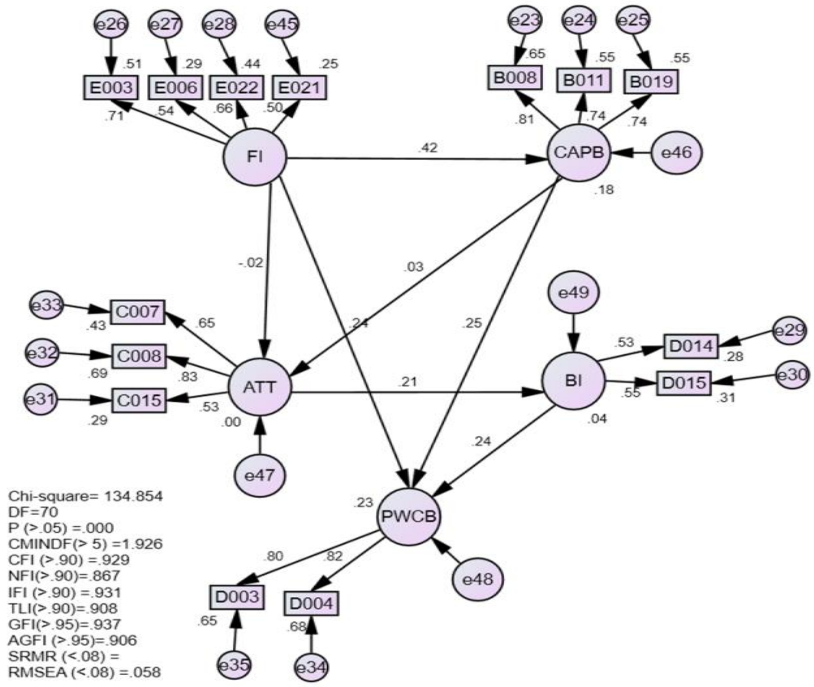

Figure 3. Pro-wildlife conservation model

The result of the unconstraint structural model of pro-wildlife conservation in Figure 3 shows the measurement errors associated with each indicator, standardized regression weight that captured the magnitude of the relationship between the constructs and the manifest indicators. The only pure exogenous latent variable in the study is financial inclusion. The construct wildlife capacity building, attitude towards wildlife and behavioral intention are mediators while pro-wildlife conservation behavior is an endogenous construct.

The results of the findings in Table 9 reveal that financial inclusion had a significant positive direct effect on wildlife capacity building and pro-wildlife conservation behavior. The result equally shows that wildlife capacity building had significant positive direct effects on pro-wildlife conservation behavior. Both financial inclusion and capacity building did not show any significant effects on attitude towards wildlife conservation behavior. The result shows that behavioral intention had a significant positive effect on pro-wildlife conservation behavior.

Table 9. The Result of Path Regression

Hypothesized Path	Estimate (SE) [C.R]	p-value	Decision
FI --> CAPB	.498* (0.099) [5.020]	0.000	Supported
CAPB --> PWCB	.245* (0.082) [2.988]	0.003	Supported
FI --> PWCB	.270* (0.103) [2.624]	0.009	Supported
BI --> PWCB	.536* (0.232) [2.313]	0.021	Supported
CAPB --> ATT	.021 (.056) [.370]	0.711	Not Supported
FI --> ATT	-.015 (0.070) [-0.212]	0.832	Not Supported
ATT --> BI	.164** (0.083) [1.975]	0.045	Supported

The result of the findings shows that financial inclusion, capacity building and behavioral intention were direct significant predictors of pro-wildlife conservation behavior. The finding reveals that financial inclusion and capacity building did not have a significant effect on attitudes toward wildlife conservation through the attitudes that were found to be significant in predicting behavioral intention to conserve wildlife.

The finding supports the claim of Walpole and Wilder (2008) in the literature of capacity building. They argue that building human capacity is an important tool towards achieving sustainable conservation. In another study by Hoole and Berkes (2010) on recoupling – ecologically systems for biodiversity conservation in Namibia, it shows that the creation of national reserve with the displacement of the local community without adequate support causes conflict between the managers of the reserves and indigenous people.

The findings are also in line With the work of (Kideghesho, Røskaft, & Kaltenborn, 2007) on factors influencing the conservation behavior of local people living in the Western Serengenti in Tanzania. They found out that people who were evicted when the park was created opposed the activities of wildlife conservation because they were not supported financially. Due to the absence of social networks, they formed retaliatory behavior towards wildlife species.

CONCLUSION AND SUGGESTION

The empirical findings clearly show that financial inclusion and community capacity building had significant positive effects on pro-wildlife conservation behavior among households at the Northern Periphery of Dja Biosphere Reserve. Even though the effects of financial inclusion in the prediction of pro-wildlife conservation behavior was stronger relative to that of capacity building, both were important in curbing the high dependency of households on wildlife stocks. Besides, behavior intention towards wildlife conservation was proven to be one of the significant factors in predicting pro-wildlife conservation behavior.

The findings suggest that financial inclusion and community capacity building had the tendency to reduce the decline in wildlife stocks as they promoted friendly behavior towards wildlife and its habitats. The study, therefore, recommends that policies that support financial inclusion and community capacity building are essential for sustainable conservation since they promote pro-wildlife conservation behavior.

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Appendix. Mathematical exposition of factor analysis used in the study

The study makes use of factor analysis and confirmatory factor analysis. The rational for the use of factor analysis was the factorability of the indicators as well as the dimensional reduction. The purpose of factor analysis is to describe, if possible, the covariance relationships among the observable characteristics of the aforementioned constructs in terms of a few underlings items (Jolliffe, 1989) with unobservable random quantities called factor (Ofeh & Thalut, 2018). The unobservable variables in the study were: financial inclusion (FI), community capacity building (CAPB), attitude toward wildlife (ATTW), behavioral intentions (BI), and pro-wildlife conservation behavior (PWCB). Factor analysis will permit us to establish whether or not any covariance relationships exist among the observable characteristics of the aforementioned constructs (Ofeh & Thalut, 2018). The general model specification is expressed as

$$X_{p.1} = \mu_{p.1} + \Gamma_{m.p} F_{p.m} + \varepsilon \qquad (1)$$

Where the breakdown components of the econometrical exposition of factor analysis in equation 1 are;

$$\underset{p.1}{X} = \begin{pmatrix} x_1 \\ x_2 \\ . \\ . \\ x_p \end{pmatrix}, \underset{p.1}{\mu} = \begin{pmatrix} \mu_1 \\ \mu_2 \\ . \\ . \\ \mu_p \end{pmatrix} \qquad (2)$$

X is the outcome or observable variables or indicators. These observed variables are the Likert scale question items on the questionnaire. The study adopted a five-point Likert scale; strongly disagree, disagree, neutral, agree, and strongly agree. μ is the mean vector of the manifest variable, it has p rows 1 column. The matrix of coefficient ($\underset{p.m}{\Gamma}$) is given as;

$$\underset{p.m}{\Gamma} = \begin{pmatrix} \lambda_{11} & \lambda_{12} & \cdots & \lambda_{1m} \\ \lambda_{21} & \lambda_{22} & \cdots & \lambda_{2m} \\ . & & & \\ . & & & \\ \lambda_{p1} & \lambda_{p2} & \cdots & \lambda_{pm} \end{pmatrix} \qquad (3)$$

The coefficient matrix of the factor loading measures the correlation between the factors; financial inclusion, community capacity building, attitude towards the wildlife conservation, behavioral intention, and pro-wildlife conservation behavior and manifest variables. This model assumed that the relationships between the factors and manifest variables are linear (Gorsuch, 1990). The factor matrix denoted $\underset{PX1}{F}$ is given as;

$$\underset{p.1}{F} = \begin{pmatrix} F_1 \\ F_2 \\ . \\ . \\ F_p \end{pmatrix} \qquad (4)$$

It is assumed that the factor is measured with some degree of errors. These errors are described as idiosyncratic terms which constitute the measurement error, hence the inclusion of the error vector matrix.

$$\underset{p.1}{\varepsilon} = \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ . \\ . \\ \varepsilon_p \end{pmatrix} \qquad (5)$$

Factor analysis assumes that there is no relationship between the factors when explaining the variation in the manifest variables. Thus, they are orthogonal (or independent). Other assumptions of factor analysis are as follows; i) the expected mean of the manifest variables should be equal to the population mean, the covariance of the manifest variables (variability) should be explained by the factor loading and the error. Mathematically, the covariance of the manifest variables is expressed as;

$$Cov(X) = \Gamma\Gamma^T + \varphi \qquad (6)$$

The Variance-covariance matrix of the manifest variables, which defines expression (6), has two components: the factor loadings with its transpose also called the communality and the unique factor (or the unexplained) which measures the percentages of specific variance of the manifest. Communality measures the percentages of variance explained by the indicator under the underling factors. Ofeh & Thalut (2018) and Abideen et al., (2012) recommend that the communality should be greater than 0.5. Where $\Gamma\Gamma^T$ in expression (6) in the matrix form is given by

$$\Gamma\Gamma^{T}_{p.m} = \begin{pmatrix} \sum_{k=1}^{m}\lambda_{1k}^{2} & \sum_{k=1}^{m}\lambda_{1k}\lambda_{2k} & \cdots & \sum_{k=1}^{m}\lambda_{1k}\lambda_{pk} \\ . & \sum_{k=1}^{m}\lambda_{2k}^{2} & \cdots & \\ . & & & \\ . & & & \\ \sum_{k=1}^{m}\lambda_{1k}\lambda_{pk} & \cdots & . & \sum_{k=1}^{m}\lambda_{pk}^{2} \end{pmatrix} \quad (7)$$

The diagonal elements of the factor loading matrix in expression (7) measure the variability in the manifest variables. Manifest variables are the indicators used to represent the constructs. The covariance matrix is presented below in the expression (8).

$$\mathrm{Cov(X)} = \begin{pmatrix} \sigma_{11} & \sigma_{12} & \cdots & \sigma_{1p} \\ \sigma_{21} & \sigma_{22} & \cdots & \sigma_{2p} \\ . & & & \\ . & & & \\ \sigma_{1p} & 0 & \cdots & \sigma_{pp} \end{pmatrix} \quad (8)$$

The unique or unexplained variance is given by the vector matrix, which is defined as;

$$\varphi_{p.p} = \begin{pmatrix} \varphi_{11} & 0 & \dots & 0 \\ 0 & \varphi_{22} & \dots & 0 \\ . & & & \\ . & & & \\ 0 & 0 & \dots & \varphi_{pp} \end{pmatrix} \quad (9)$$

Considering the matrix in expression 8 and 9, financial inclusion is assumed to be influenced by observed variables on the questionnaire say X1, X2 and Xp as illustrated by the system of structural equations below. The factor structures for financial inclusion are;

X_1=λ_11 FI1+e1
X_2=λ_21 FI1+e2
. (10)
.
.
X_p=λ_p1 FI1+ep

Where λs are factor loadings mentioned supra and e1, e2, … ep are measurement errors. From the covariance matrix in expression 7, derived a mathematical exposition for the factor financial inclusion.

$$\sigma_{11} = \lambda_{11}^{2} + \lambda_{21}^{2} + \lambda_{m1}^{2} + \varphi_{11} \quad (11)$$

The sum of lambda-square (λ_{ik}^2) is the communality of Xj in financial inclusion meanwhile φ_{11} is the unique variance. It is essential to note that communality represents the percentage variability in observable variables that were extracted using factor analysis. Factor loading is equivalent to the coefficient of determination in the regression analysis; since each is considered as a single regression.

Mathematical exposition of confirmatory factor analysis

Confirmatory factor analysis shows the relationship between financial inclusion (FI), community capacity building (CAPB), attitude towards wildlife (ATTW), behavioral intentions (BI), and pro-wildlife conservation behavior (PWCB) on one hand and on another relationship between the latent variable and observed variables with its measurement errors.

In the confirmatory factor model in the study, there are five constructs. The constructs have been numbered to permit us to specify the technical structural equations for the various constructs as observed in Figure 1a.

Each construct is measured using a set of question items on the questionnaire. The question items used to capture the constructs were extracted during the exploratory factor analysis. Financial inclusion was measured using X1, X2 and X3 as observed in CFA measurement model in figure 1. Community capacity building was captured using X4, X5 and X6 while attitudes towards wildlife conservation were measured X7, X8 and X9. Behavioral intention and pro-wildlife conservation behavior were measured using X10, X11, X12, and X13, X14, X15 respectively. The observed variables were represented in a rectangle while constructs were represented in a circle while the e1, e2, e3 …, e15 were the measurement errors.

From the measurement model in Figure 1a, the following factor equations were derived to show the relationships between the concepts and items. The factor structure equations for financial inclusion are;

X_1=λ_11 FI1+e1
X_2=λ_21 FI1+e2 (12)
X_3=λ_p1 FI1+e3

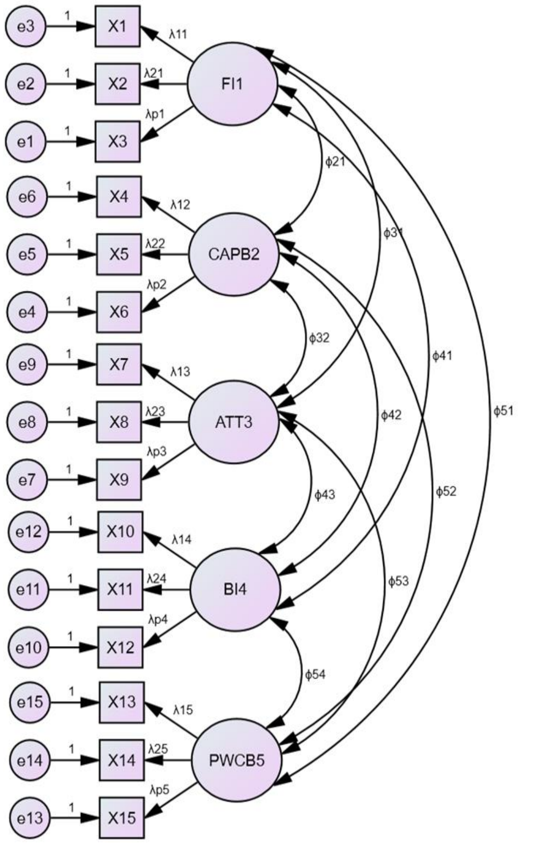

Figure 1a. Confirmatory factor measurement model

The factor structure equations for Community Capacity Building are;

X_4=λ_12 CAPB2+e4
X_5=λ_22 CAPB2+e5 (13)
X_6=λ_p2 CAPB2+e6

The factor structure equations for attitudes towards wildlife conservation are;

X_7=λ_13 ATT3+e7
X_8=λ_23 ATT3+e8 (14)
X_9=λ_p3 ATT3+e9

The factor structure equations for Behavioral Intention are;

X_10=λ_14 BI4+e10
X_11=λ_24 BI4+e11 (15)
X_12=λ_p4 BI4+e12

The factor structure equations for Pro-Wildlife Conservation Behavior are;

X_13=λ_15 PWCB5+e13
X_14=λ_25 PWCB5+e14 (16)
X_15=λ_p5 PWCB5+e15

In matrix form,

$$\begin{pmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \\ X_5 \\ X_6 \\ X_7 \\ X_8 \\ X_9 \\ X_{10} \\ X_{11} \\ X_{12} \\ X_{13} \\ X_{14} \\ X_{15} \end{pmatrix} = \begin{pmatrix} \lambda_{11} & 0 & 0 & 0 & 0 \\ \lambda_{21} & 0 & 0 & 0 & 0 \\ \lambda_{p1} & 0 & 0 & 0 & 0 \\ 0 & \lambda_{12} & 0 & 0 & 0 \\ 0 & \lambda_{22} & 0 & 0 & 0 \\ 0 & \lambda_{p2} & 0 & 0 & 0 \\ 0 & 0 & \lambda_{13} & 0 & 0 \\ 0 & 0 & \lambda_{23} & 0 & 0 \\ 0 & 0 & \lambda_{p3} & 0 & 0 \\ 0 & 0 & 0 & \lambda_{14} & 0 \\ 0 & 0 & 0 & \lambda_{24} & 0 \\ 0 & 0 & 0 & \lambda_{p4} & 0 \\ 0 & 0 & 0 & 0 & \lambda_{15} \\ 0 & 0 & 0 & 0 & \lambda_{25} \\ 0 & 0 & 0 & 0 & \lambda_{p5} \end{pmatrix} \begin{pmatrix} FI1 \\ CAPB2 \\ ATT3 \\ BI4 \\ PWCB5 \end{pmatrix} + \begin{pmatrix} e_1 \\ e_2 \\ e_3 \\ e_4 \\ e_5 \\ e_6 \\ e_7 \\ e_8 \\ e_9 \\ e_{10} \\ e_{11} \\ e_{12} \\ e_{13} \\ e_{14} \\ e_{15} \end{pmatrix} \quad (17)$$

Where;

Xs: observed variables

Γ: λs are factor loadings or regression weights

ζ : FI1, CAPB2, ATT3, BI4 and PWCB5 are the constructs in the confirmatory model

ε: e1, e2, e3 …, e15 are measurement Errors

The confirmatory factor analysis assumed that the covariance of the mathematical expectation of the latent factor matrix times its transpose is equal to an identity matrix, that is, E(ζ ζT)= ψ. The confirmatory factor model is specified as

$$X = \Gamma.\zeta + \varepsilon \quad (18)$$

The covariance- variance of X has two components; explained variance and covariance as well as the correlation between the constructs. The variance of the error measurement is also estimated. With a bit of algebraic expression of equation 18, we have;

$$Cov(X) = \Gamma \psi \Gamma T + \Phi \quad (19)$$

Where Γ ΓT in the covariance- variance - matrix in expression 13 of the extracted manifest variables and constructs as observed in expression 12 to 16 is summarized as seen in Figure 2a. The outcome of the multiplication of the covariance matrix gives the variance and the covariance of the factor loadings as well as error variances (see Figure 3a).

$$\Gamma\Gamma^{T}=\begin{pmatrix}
\lambda_{11} & 0 & 0 & 0 & 0\\
\lambda_{21} & 0 & 0 & 0 & 0\\
\lambda_{p1} & 0 & 0 & 0 & 0\\
0 & \lambda_{12} & 0 & 0 & 0\\
0 & \lambda_{22} & 0 & 0 & 0\\
0 & \lambda_{p2} & 0 & 0 & 0\\
0 & 0 & \lambda_{13} & 0 & 0\\
0 & 0 & \lambda_{23} & 0 & 0\\
0 & 0 & \lambda_{p3} & 0 & 0\\
0 & 0 & 0 & \lambda_{14} & 0\\
0 & 0 & 0 & \lambda_{24} & 0\\
0 & 0 & 0 & \lambda_{p4} & 0\\
0 & 0 & 0 & 0 & \lambda_{15}\\
0 & 0 & 0 & 0 & \lambda_{25}\\
0 & 0 & 0 & 0 & \lambda_{p5}
\end{pmatrix}
\begin{pmatrix}
\lambda_{11} & \lambda_{21} & \lambda_{p1} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0\\
0 & 0 & 0 & \lambda_{12} & \lambda_{22} & \lambda_{p2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0\\
0 & 0 & 0 & 0 & 0 & 0 & \lambda_{13} & \lambda_{23} & \lambda_{p3} & 0 & 0 & 0 & 0 & 0 & 0\\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \lambda_{14} & \lambda_{24} & \lambda_{p4} & 0 & 0 & 0\\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \lambda_{15} & \lambda_{25} & \lambda_{p5}
\end{pmatrix}$$

Figure 2a. The extracted manifest variables and constructs

$$\Gamma\Gamma^{T}=\begin{pmatrix}
\lambda_{11}^{2} & \lambda_{11}\lambda_{21} & \lambda_{11}\lambda_{p1} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0\\
\lambda_{21}\lambda_{11} & \lambda_{21}^{2} & \lambda_{21}\lambda_{p1} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0\\
\lambda_{p1}\lambda_{11} & \lambda_{p1}\lambda_{21} & \lambda_{p1}^{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0\\
0 & 0 & 0 & \lambda_{12}^{2} & \lambda_{12}\lambda_{22} & \lambda_{12}\lambda_{p2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0\\
0 & 0 & 0 & \lambda_{22}\lambda_{12} & \lambda_{22}^{2} & \lambda_{22}\lambda_{p2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0\\
0 & 0 & 0 & \lambda_{p2}\lambda_{12} & \lambda_{p2}\lambda_{22} & \lambda_{p2}^{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0\\
0 & 0 & 0 & 0 & 0 & 0 & \lambda_{13}^{2} & \lambda_{13}\lambda_{23} & \lambda_{13}\lambda_{p3} & 0 & 0 & 0 & 0 & 0 & 0\\
0 & 0 & 0 & 0 & 0 & 0 & \lambda_{23}\lambda_{13} & \lambda_{23}^{2} & \lambda_{23}\lambda_{p3} & 0 & 0 & 0 & 0 & 0 & 0\\
0 & 0 & 0 & 0 & 0 & 0 & \lambda_{p3}\lambda_{13} & \lambda_{p3}\lambda_{23} & \lambda_{p3}^{2} & 0 & 0 & 0 & 0 & 0 & 0\\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \lambda_{14}^{2} & \lambda_{14}\lambda_{24} & \lambda_{14}\lambda_{p4} & 0 & 0 & 0\\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \lambda_{24}\lambda_{14} & \lambda_{24}^{2} & \lambda_{24}\lambda_{p4} & 0 & 0 & 0\\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \lambda_{p4}\lambda_{14} & \lambda_{p4}\lambda_{24} & \lambda_{p4}^{2} & 0 & 0 & 0\\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \lambda_{15}^{2} & \lambda_{15}\lambda_{25} & \lambda_{15}\lambda_{p5}\\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \lambda_{25}\lambda_{15} & \lambda_{25}^{2} & \lambda_{25}\lambda_{p5}\\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \lambda_{p5}\lambda_{15} & \lambda_{p5}\lambda_{25} & \lambda_{p5}^{2}
\end{pmatrix}$$

$$\varphi=\begin{pmatrix}
\phi_{11} & - & - & - & -\\
\phi_{21} & \phi_{22} & - & - & -\\
\phi_{31} & \phi_{32} & \phi_{33} & - & -\\
\phi_{41} & \phi_{42} & \phi_{43} & \phi_{44} & -\\
\phi_{51} & \phi_{52} & \phi_{53} & \phi_{54} & \phi_{55}
\end{pmatrix}$$

Figure 3a. Covariance – variance of factor loadings matrix/correlation matrix