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Exploratory study on performance variables in producer organizations in Chhattisgarh

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Abstract
Establishment and promotion of farmer collectivization can provide a platform to farmers for receiving much-required information, sharing of knowledge, sharing the production, and marketing risks and adoption of market-led production of agricultural products. Grass root level actions on collectivization of the marginal agrarian folks can improve their livelihood support as income, self-respect, bargaining power etc as compared to the individual approach. The purpose of this study is to identify and examine the underlying factors responsible for performance of farmers' groups in producer companies which are performing fairly well on the ground. The findings reveal that one should pay more attention to the performance variables indicated in the study to achieve desirable performance outcome.

Keywords: Farmer Producer Company, performance variables, group performance

Introduction
Producer Organizations are private entities characterized by the organization to make profits and perform various functions such as economic, social etc. (of which few functions maybe not for profit), they may operate in micro as well as macro-level and they evolve over a period (Bosc. *et al*. 2002) [1]. It is argued that the establishment and promotion of farmer collectivization can provide a platform to farmers for receiving much-required information, sharing of knowledge, sharing the production, and marketing risks and adoption of market-led production of agricultural products such as a shift from regular food crop to a cash crop. (Barghouti *et al.* 2004; Bikkina *et al.,* 2018) [2, 3]. A study conducted by Trebbin (2014) [4] demonstrated the potential of Producer Organizations as an interface between smallholder farmers and supermarket chains in India. Furthermore, Nirgude *et al*. (2020) [5] demonstrated the power of collectivization on grapes cultivation through Abhinav Farmer Club (Farmers club having presence across India) and found better farm economics for farmers collective approach compare to individual approach. Therefore, it can be argued that grass root level actions on collectivization of the marginal agrarian folks can improve their livelihood support as income, self-respect, bargaining power etc as compared to the individual approach (Agarwal, B., 2010) [6].

In India, Producer organizations in the farming sector are legalized as Producer Companies (PC). They are one of the legal entities among others which is relatively new for any agricultural produce, artisanship, forest producer or any other primary activity or service which promotes the interest of farmer/producers and consumers. PC as a special case of producer organization is registered under the Section IX-A of the Companies Act 1956, reference section 465(1) of the Companies Act, 2013. The Department of Agriculture, Cooperation and Farmers Welfare, Government of India in 2013 introduced a National Policy for Farmer Producer Organization (FPO) and identified PC as the most appropriate entity to mobilize farmers and build their capacity to improve access to investments, technology, inputs, markets and to address the many challenges faced by farming community (NIAM, n.d.; Ministry of Agriculture, 2013) [7].

As significant studies have documented the numerous benefits of collectivization of farmers (Balakrishnan *et al*, 2018; Trebbin, 2014; Agarwal, 2010; Deepa *et al*., 2018; Kumar *et al*, 2015; Barghouti *et al.* 2004; Bikkina *et al.* 2018) [6, 8, 9, 10, 4, 2, 3]. On contrary, it is also evident that FPOs are encountering various problems such as lack of vision, lack of professionalism, weak planning etc. (Joshi and Choudhary, 2018) [11]. Furthermore, a smaller number of successful links between producer organizations and retail chains were also observed in India (Shah, 2016) [12].

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The empirical finding reveals that if a village has social cohesiveness and an external agent (qualified), it can achieve significant success in Agriculture and other developments (Grootaert, & Van Bastelaer, 2002) [13]. A study conducted by Nithya et al (2019) [14] exemplify the potential of social capital in the socio-economic development of smallholder farmers such as pooling of resources, joint cultivation and marketing practices and thereby maintaining relationships and trust-based interactions. A case study of the Gal Oya Farmer Organization substantiates the economic benefits in terms of increasing the area cultivated and irrigated, water use efficiency, productivity, and profitability due to collective action of farmers to manage 'deficit water supply' (Uphoff, & Wijayaratna, 2000) [15]. Other studies also had congruent empirical findings, for instance, a study conducted by Svendsen and Svendsen, 2001 demonstrated that an appropriate level of social capital will save the cost associated with monitoring and transaction of Danish Cooperative Dairy. Further, a study conducted by Xu, (2018) [17] demarketing the influence of bonding social capital over bridging social capital significantly with positive effects on cooperative members' income increase.

FPCs in the State of Chhattisgarh
In the state of Chhattisgarh, a total of 60 FPOs are promoted by NABARD out of which only 11 (in Chhattisgarh plain region) have been able to register themselves under the Companies act. The major businesses of FPOs in the region are found to be production and marketing of fruits and vegetables collectively, input supply, the dealership in inputs and bulk buying of inputs and their sales to members, milk production, mushroom and its value-added products, vermicompost and NTFPs etc. (Joshi et al. 2018) [11].
Table 1 below shows the no. of FPCs who have received equity grant funds under the Credit Guarantee Scheme of SFAC from 2014-2015 to 2019-2020. As is evident, only 4 FPCS have been able to receive the grant from the state.

Table 1: Selected State-wise Number of Farmer Producer Companies (FPCs) and Amount Sanctioned under Equity Grant Fund and Credit Guarantee Fund Schemes by Small Farmers Agribusiness Consortium (SFAC) in India (2014-2015 to 2019-2020)

States	No. of Equity Grant Sanctioned	Total Amount (Rs. in Lakhs)	No. of Cases	C.G. Cover Sanctioned
Maharashtra	96	566.28	18	797.11
Uttar Pradesh	87	444.16	-	-
Tamil Nadu	84	632.9	29	1402.96
Karnataka	73	678.46	12	318.53
West Bengal	63	307.47	1	42.5
Madhya Pradesh	58	266.12	18	720.66
Bihar	23	115.73	-	-
Haryana	11	92.51	3	84.15
Andhra Pradesh	10	44.07	-	-
Rajasthan	10	55.21	3	56.1
Odisha	8	62.66	1	25.5
Gujarat	7	50.52	8	121.55
Telangana	5	26.34	1	17.7
Chhattisgarh	4	19.48	-	-
Manipur	3	23.16	-	-
Kerala	2	16.85	2	102
Himachal Pradesh	1	2.84	-	-
Tripura	1	8.44	-	-
Uttarakhand	1	10	-	-
India	547	3423.18	96	3688.76

Note: Out of 489 cases, 18 FPCs have taken 2nd tranche of the grant
Source: Ministry of Agriculture & Farmers Welfare, Govt. of India. (ON2298)

Conceptual Framework and Methodology
The purpose of this study is to identify and examine the underlying factors responsible for performance of farmers' groups in producer companies which are performing fairly well on the ground. A study demonstrates the effect of member farmers groups' on-farm performance and indicates that member farmers are more likely to be early adopters of technology and improve farm productivity (Ainembabazi et. 2017) [18]. In this study, FPO Performance indicators were taken from the study of Bikkina et al. (2018) [3] based on seven performance criteria i.e. Financial Services, Input supply services, Procurement and Packaging services, Marketing Services, Insurance services, technical services and Networking services.
Chhattisgarh state is divided into 3 sub agroclimatic zones namely Northern Hills, Central Plains and Bastar Plateau. Looking to the concentration of FPCs in the three zones, 1 FPC from Northern hill zone, 2 from central plains and 2 from Bastar plateau were selected for the study. Accordingly, a 10% proportionate sample of total member farmers was taken from the FPCs resulting in a total sample size of 336.
The Performance of Producer Company was measured using a unidirectional construct with an 18-item inventory from the literature (Bikkina et al., 2018) [3]. These variables were spread across Financial Services, Marketing Services, and Technical Services. The responses were measured using a 5-point Likert Scale (1 = strongly disagreed, 5 = strongly agreed). Apart from the above, the data on demographic, socioeconomic variables and business performance were also collected to find the correlation between parameters and the performance of FPC. Since all the variables were measured at the same time and from the same individual, the measurement may cause common method bias. Thus, the procedural and statistical control was kept in the consideration. Data thus collected from producer company members was then analysed using SPSS version 28 and XLSTAT software package. Total no. of farmers interviewed for the study were 363 across the 3 sub agroclimatic zones of the state.

Results and Discussion
Major descriptors of FPCs are age of the FPC, legal forms, nature of POPI , years of involvement with farmers prior to FPC promotion, No. of shareholders, authorised capital (in Rs. Lakhs), major commodities of FPC, yearly board meeting and yearly annual general meetings conducted. Produce Company Korea Agro Producer Company Limited (KAPCL) deals with multi-commodities and have maximum number of members. The turnover of KAPCL is 44.00 (Rs. lakhs) with profit of 19.00 (Rs. lakhs). Bhumgadi Mahila Krushak Producer Co.Ltd (BMKPCL) have the highest turnover of 428.49 (Rs. lakhs) and profit of 88.48 ((Rs. lakhs). This producer company also have the maximum number of shares of the company. Brief profile and business performances of selected FPCs are illustrated in table 2 and 3.

Descriptive Statistics (DS) of Socio-Economic Characteristics
The socio-economic parameters of selected FPCs comprises of age, education, landownership, experience respectively. The table 4 and fig.1 depicts descriptive statistics and histogram results in which respondent belonged from age group (19-85 years) with maximum number of respondent belonging to age group of 31 to 40 years which represents a

fairly young population. Moreover, for gender maximum number of respondent were male with an education level of at least graduate and having an average experience of farming association with the group ranging between one to two years. Furthermore, for land-ownership respondent ranged from 1 hac to 5 hac with average land holding of 2 hac. The experience among respondent ranged from 1 to 9 years with average experience of 3 years.

Descriptive Statistics for selected variables
The variables selected and studied as independent variables are Input supply and assistance (INSA), Price negotiation for input (PNI), Extension and advisory service provision (EAS), Agricultural productivity changes (APC), Market Access (MA), Price increase for produce (PIP), Bargaining Power (BP), Risk Management (RM), Reduction in Transaction Cost (RTC), Economy of Scale (ES), Vertical Integration (VI), Processing and Value Addition (PVA), Joint use of Equipment and Storage (JUE), Quality Assurance (QA), Social Cohesion (SC), Trust and Partnership among Members (TP), Special Skill Development (SCD), Entrepreneurship Culture (ENT). The mean value of respondents for all the variables are shown in table 5.

Table 2: Brief Profiles of the FPCs

Age of the FPC	Legal Form	Nature of POPI	Years of involvement with farmers prior to FPC promotion	No. of shareholders	Authorised Capital (in Rs. Lakhs)	Major commodities FPC deals with	Yearly board meeting conducted	Yearly Annual general meetings conducted
6	Korea Agro Producer Company Limited	KVK, NRLM	5	590	10	Mustard Oil, Detergent Powder, Detergent Powder premium, Desi Urad Dal, Kulthi Dal, Masur Dal, Desi Arhar Dal (Toor Dal), Moong Dal, Desi Rice, Roasted and Split Horse Gram, Desi Jeraphool Classic Rice.	10	6
3	Jai Kopeshwar Nath Krishak Utpadak Company Limited Bhendri	NABARD	3	154	5.5	Paddy seed	12	01
6	Ojasvee Krishak Utpadak Sansthan ,Kurud Dist- Dhaamtari (CG)	NRLM	5	536	2	Organic rice (black rice, Green rice zinc rice) and vegetables	8	12
8	Mahanadi Farmer Producer Company pvt ltd, Lakhanpuri, Kanker C.G.	Technoserve	1	767	11	Custard Apple Pulp, Blackberry Pulp, Mango Pulp.	3	1
5	Bhumgadi mahila krushak producer co. ltd Bastar	(NRLM)	4	6100	8.1	Tamarind, maize, cashew, amchur, kodo, kutaki, ragi, turmeric, black gram, black rice, red rice and vegetables.	12	1

Table 3: Business performance of selected FPCs

Name of the Producer Company	Year/turnover	Turnover (in Rs. lakhs)	Profit (in Rs. lakhs)	No. of members	Total no. of shares of the company
KAPCL	2021	44.00	19.00	5900	5900
JNKPC	2021	44.20	12.42	81	154
OKUS	2021	56.72	16.36	200	536
MFPCL	2021	68.39	12.19	767	767
BMKPCL	2020	428.49	88.48	5227	6700

Where,
KAPCL= Korea Agro Producer Company Limited, JNKPC = Jai Kopeshwar Nath Krishak Utpadak Company Limited Bhendri, OKUS = Ojasvee Krishak Utpadak Sansthan, Kurud Dist- Dhaamtari (CG), MFPCL = Mahanadi Farmer Producer Company Pvt Ltd, Lakhanpuri, Kanker C.G., BMKPCL = Bhumgadi mahila krushak producer co. Ltd Bastar

Table 4: Descriptive Statistics of Socioeconomic characteristics for selected FPCs in the study area

Statistic	Age	Gender	Edu	Landownership	Experience
Minimum	19.00	1..00	1.00	1.00	1.00
Maximum	85.00	2.00	6.00	5.00	9.00
Median	38.00	1.00	4.00	3.00	2.00
Mean	38.04	1.00	3.42	2.00	3.00
Standard Error	0.51	0.03	0.08	0.05	0.09
Variance (n-1)	96.25	0.24	2.35	0.79	3.24
Standard deviation	9.81	0.49	1.53	0.89	1.80
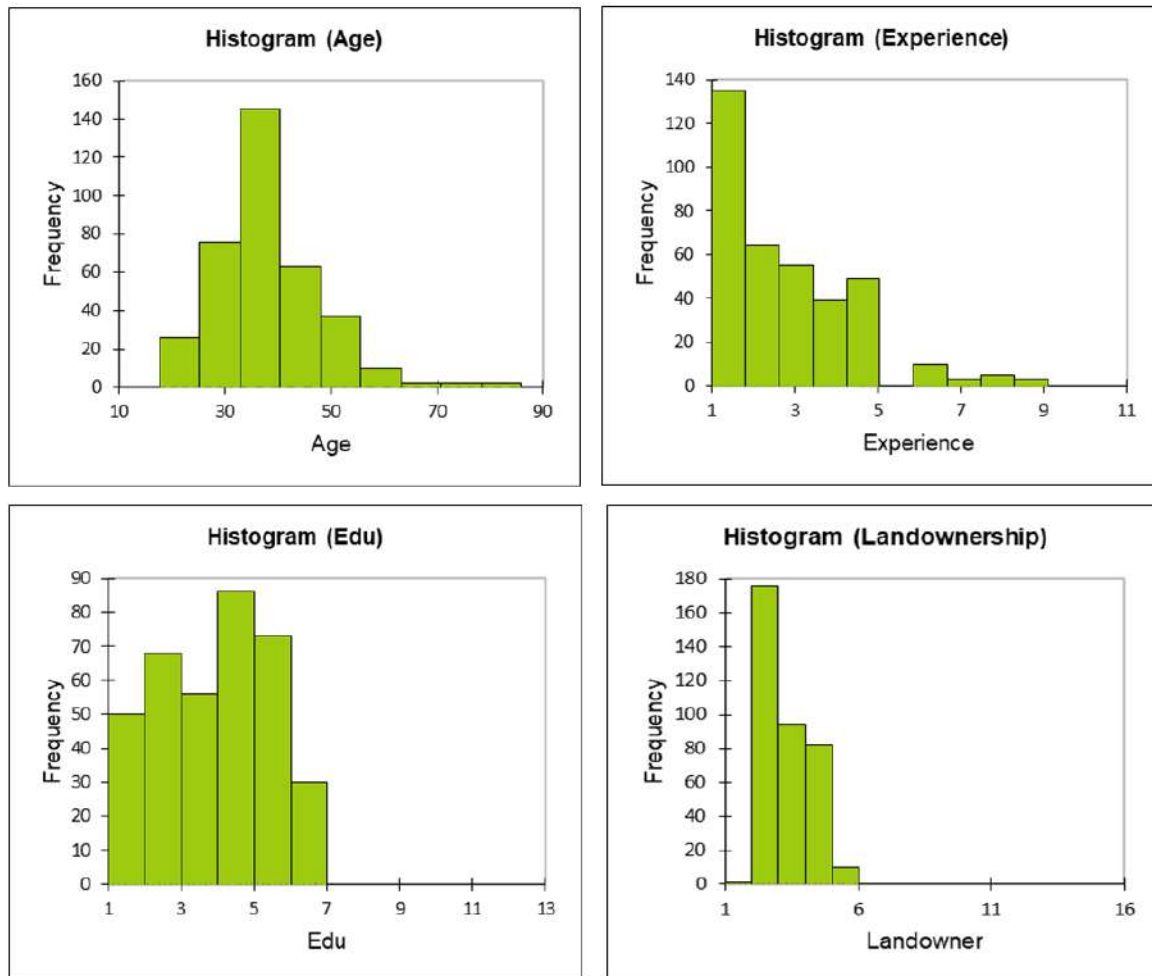
Fig 1: Histogram of socio-economic parameters

Table 5: Descriptive Statistics

	Mean	Std. Deviation
INSA	3.73	1.15
PNI	3.95	0.93
EAS	3.91	1.02
APC	4.25	.93
MA	4.14	1.08
PIP	3.92	0.94
BP	3.78	1.00
RM	3.88	0.87
RTC	3.92	0.94
ES	3.90	0.95
VI	3.43	1.22
PVA	3.92	0.99
JUE	3.90	1.03
QA	4.15	0.69
SCO	3.89	1.11
TP	3.92	1.07
SCD	4.01	0.94
ENT	3.77	1.03

Correlation Analysis (CA) and Principle Component Analysis (PCA)

Correlation heat map in fig. 2 shows the selected variables are sufficiently correlated for variables to be reduced to a smaller number of components. The variables now can be reduced to few factors explaining much of the actual data, more economically.

The PCA have identified underlying four factors from an array of seemingly important variables. The PCA reduces the data complexity and identifies the actual underlying drivers/variable of the FPC performance. These factors are extracted by computation of eigen value. Eigen value determines the amount of variation explained by the factor.

The factor rotation matrix depicted in table 6 gives the loading of each variable on each of the extracted factors. The matrix shows the factors associated with the original variable. The factor 1 can be said as the linear combination of variable APC, MA, PNI, JUE, PIP, EAS as they have the highest loading (close to 1). Similarly, the factor 2 is the

amalgation of variables SCD, TP, RTC, SCO with loading of 0.856, 0.687, 0.672 and 0.668, respectively while factor 3 is the merger of variables 0.882 and 0.664. Moreover, the factor 4 is explained by only one variable *i.e.* RM.

As evident from table 7 we find that the four factors extracted account for 62.43% of the total variation (information contained in the original 18 variables). After PCA, significant variables with maximum loading were selected and data associated with variables is displayed through radar chart (fig.3) and (table 8). Radar chart illustrates the region-wise *i.e.* Northern Hills, Central Plains, Baster Plateau distribution of respondents for most significant variables. All the estimated variables in central plains are farther towards the end of the spike showing the largest value followed by baster plateau and northern hills. This explains the significance of the variables as most influential towards the performance of the group. As evident from the loading values of the Agricultural Productivity Changes, Market Access, Quality Assurance were the most influential variables for FPCs in the central plains whereas Agricultural Productivity Changes, Quality Assurance, and Market Access were the most influential for the FPCs of the Bastar plateau. For the FPC of the northern hill zone, Special skill Development, Agricultural Productivity Changes and Trust and partnership were the most influential variables. It is evident from the research outcome that region alters the importance of the variables as the needs and priorities of the farmers and agriculture pattern changes from one place to another hence varied expectations in performance. The findings reveal that one should pay more attention to the performance variables indicated in the study to achieve desirable performance outcome. A strong sense of building these variable will help policy makers on the focus shift towards group performance variables. Capacity building programmes must be formulated in such a way that group performance and perceived performance variables responsible should be identified and efforts should be made to enhance them.

Table 6: Rotated Component Matrix

	Components			
	1	**2**	**3**	**4**
APC	.798	.073	.132	.095
MA	.789	.112	.240	-.154
PNI	.754	.262	.093	.140
JUE	.701	.250	.245	.009
PIP	.676	-.023	.089	.332
EAS	.626	.546	.015	-.043
INSA	.578	.317	.109	.042
BP	.577	.453	-.063	.355
SCD	.046	.856	.049	-.054
TP	.324	.687	.058	-.052
RTC	.029	.672	.068	.313
SCO	.526	.668	.044	-.015
ENT	.533	.557	.206	.128
PVA	.089	.090	.822	.020
QA	.155	-.043	.664	.151
VI	.391	.374	.543	.166
RM	.009	-.008	.151	.876
ES	.441	.210	.177	.482

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

Table 7: Total Variance Explained

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total
1	7.249	40.272	40.272	6.143
2	1.676	9.309	49.581	4.417
3	1.239	6.883	56.464	2.748
4	1.076	5.975	62.439	1.656

Extraction Method: Principal Component Analysis.
a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 8: Region wise values of significant variables

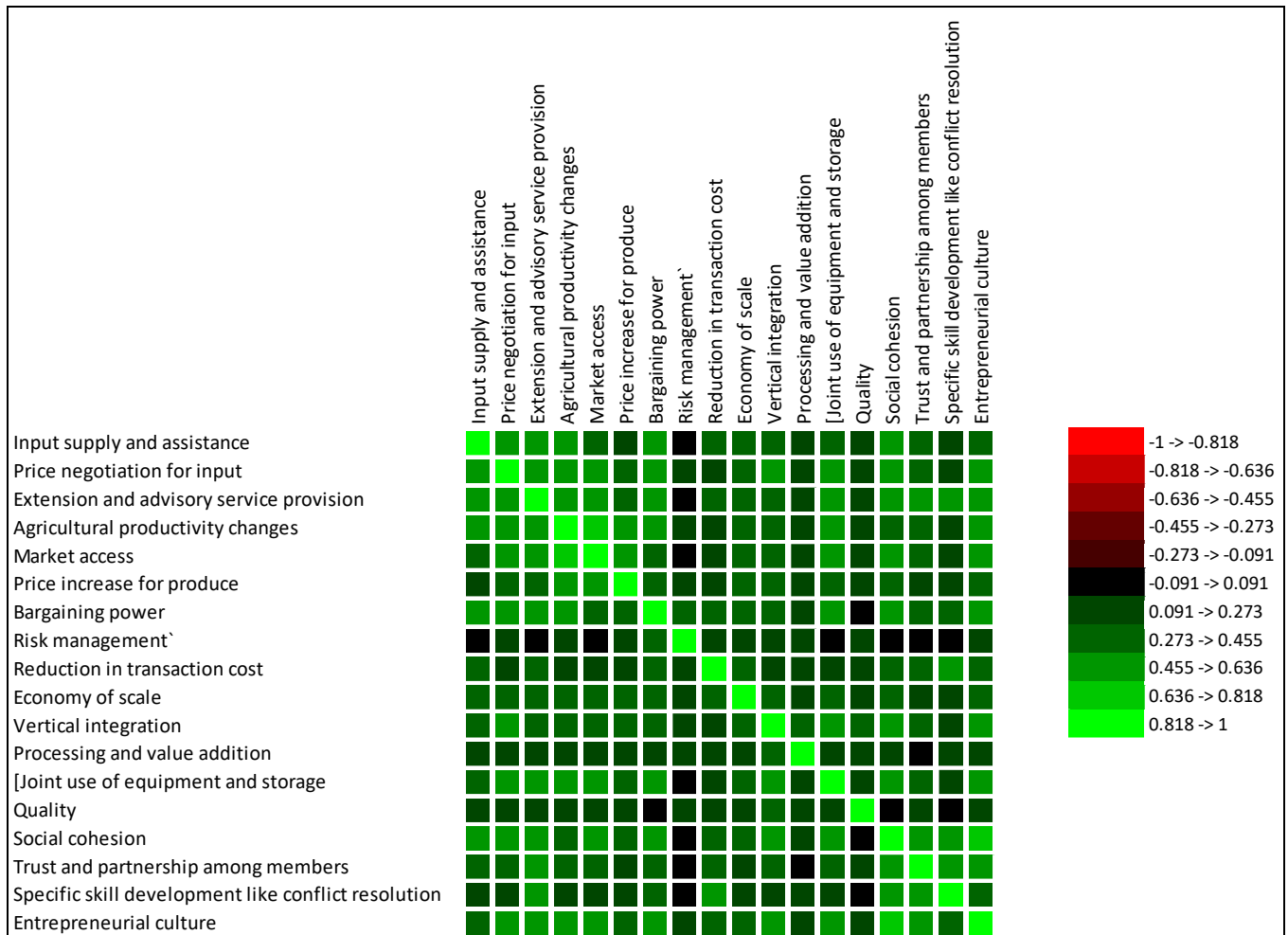|	PNI	APC	MA	PIP	RM	PVA	JUE	QA	TP	SCD
NH	3.79	3.99	3.80	3.67	3.73	3.31	3.52	3.84	3.86	4.00
CP	4.20	4.43	4.54	4.19	3.95	4.27	4.37	4.43	4.06	4.16
BP	3.86	4.26	4.02	3.87	3.91	3.96	3.75	4.10	3.85	3.93

Fig 2: Correlation heat map of estimated variables

Summary and Conclusions

The findings of present study revealed that Agricultural Productivity Changes, Market Access, Quality Assurance were the most influential variables for FPCs in the central plains whereas Agricultural Productivity Changes, Quality Assurance, and Market Access were the most influential for the FPCs of the Bastar plateau. For the FPC of the northern hill zone, Special skill Development, Agricultural Productivity Changes and Trust and partnership were the most influential variables. It is evident from the research outcome that region alters the importance of the variables as the needs and priorities of the farmers and agriculture pattern changes from one place to another hence varied expectations in performance. Therefore, it is concluded that one should pay more attention to the performance variables indicated in the study to achieve desirable performance outcome. A strong sense of building these variable will help policy makers on the focus shift towards group performance variables. Capacity building programmes must be formulated in such a way that group performance and perceived performance variables responsible should be identified and efforts should be made to enhance them.

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