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Factor Analysis of Service Expectation of Farmer Producer Organization from Agribusiness Incubator

R. Ramesh Kumar[1*], M. Malarkodi[2] and K. Uma[1]

[1]Department of Agricultural and Rural Management, CARDS, Tamil Nadu Agricultural University, Coimbatore, 641003, India.
[2]Directorate of Agri Business Development, Tamil Nadu Agricultural University, Coimbatore, 641003, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This paper aimed to study the service expectation of Farmer Producer Organization from the Agribusiness incubator. The study was carried out with 60 FPO's in Tamil Nadu. The data was collected through survey method using a well-structured online interview questionnaire. The exploratory factor analysis was carried out to reduce the data. The first factor named as which explained 25.37 percent of the variance, the second factor named as early stage business development services which explained 10.27 percent of the variance, the third factor named as business development services which explained 11.50 percent of the variance, the fourth factor named as physical infrastructural assistance which explained 2.21 percent of the variance. The obtained results of Exploratory Factor Analysis revealed that four factors such as market assistance services, early stage business development services, business development services and physical infrastructural assistance explained about 71.69 percent of the variance of factors with respect to service expectation of FPO's from the Business incubator.

**Corresponding author: E-mail: ram07071997@gmail.com;*

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1. INTRODUCTION

Farmer Producer Organizations (FPOs) are farmer collectives whose members are primarily small/marginal farmers (around 70 to 80 percent). Currently, the country has about 5000 FPOs (including Farmer Producer Companies) that were created during the previous 8-10 years via different efforts of the Government of India (including SFAC and NABARD), the State Government, and other organizations. Around 3200 FPOs are classified as Producer Companies, with the remainder as Cooperatives/ Societies, and so on. Most of these FPOs are in their early stages of operation, with shareholder participation ranging from 100 to over 1000 farmers, and require not only technical assistance, financial assistance and infrastructural facilities, market connections, to continue their commercial operations. Producer organizations have been described as a mix of private corporations and cooperatives Trebbin and Hassler [1]. They are characterized as "membership-based organizations or associations of companies with elected leaders responsible to their constituents" World Bank (2008). On the suggestions of a high-powered committee led by YK Alagh, India's Companies Act, 1956 was modified in 2002 to allow for the establishment of producer organizations Government of India (1999). According to Bergek and Norman [2] Incubators have become a common sight in many areas of the world, and they are seen as a tool for encouraging the creation of technology-based growth businesses. The Agri-Business Incubator (ABI) is a location where entrepreneurs may get help with technical guidance, consultancy services, connecting with management experts, start-up capital, Infrastructural facilities, and other services to help the member launch their own business. The major constraintsof FPO's are granting, agri-logistics, infrastructural setups, Innovation Support, Extension service, consultancy, quality enhancement, manufacturing, and marketing - Investment firms, non-banking financial companies (NBFCs), government institutions, ties with agricultural corporations, exporters, and direct marketing National paper [3]. The above factors are the main constraints for the growth of the FPO's and they should be rectified by services of Agribusiness incubator. By considering the above factors the objective of this paper is to analyze the service expectation of FPO from the Agribusiness Incubator.

2. REVIEW OF STUDY

Rondot and Colon [4] stated that Producer groups are official rural organizations whose members have formed themselves intending to boost farm revenue through increased production, trading, and localized processing activities. Producer Organizations are in charge of rules regarding pricing, importing, and exporting of agricultural goods, agricultural production methods, access to products and services, including agricultural credit, agricultural marketing, and local processing and post-harvest handling.

Wambugu et al. [5] found that social capital enhances the level of commercialization of rural producer groups when they investigated many topics related to small-scale farmers' integration. As a result, a key policy conclusion of the findings was that rural producer groups have the potential to decrease rural poverty by increasing smallholders' output commercialization.

According to Bjman and Wollni [6] stated that a producer organization is a company, a group, a coop, a union, a federation, or even a business created to promote the farmers. The producer organization's principal objective is to provide the services that assisted farmers in their agricultural activities, including farm marketing strategy.

Singh, Baljeet [7] stated that Business incubators play an important role in assisting aspiring entrepreneurs, particularly during the early phases of their company's lifespan. They offer a variety of services to start-up businesses such as shared workspaces, access to research laboratories, trading, financial existence, network pools, etc.

Sanjay Kumar Joshi and Vijay K. Choudhary [8] stated that Farmer Producer Organizations (FPOs) are entities that can shield small farmers from the negative impacts of liberalization while also incentivizing them to engage in modern competitive marketplaces. The Producer Company's mission is to empower and strengthen small and marginal farmers'/ producers' bargaining power and quality of life.

According to the National Commission on Farmers (NCF) (2004) Farmers' organizations should be encouraged to combine the benefits of decentralized production with centralized services,

post-harvest maintenance, income generation, and marketing.

Salvador and Rolfo [9] stated that the notion of business incubation is based on the assumption of enhancing company survival and growth by establishing methods that ensure the early identification of businesses with a high potential for success but limited resources. The idea guarantees that businesses overcome what is known as the liabilities of newness and smallness, resulting in creative firms that are competitive, lucrative, and sustainable.

According to Pitombo et al. [10] exploratory factor analysis (EFA) is a widely used and widely utilized statistical method in social sciences, information systems, education, and psychology. Exploratory Factor Analysis has been utilized for a variety of purposes, including determining connections between socioeconomic, travel patterns, land use, and participation factors.

Thompson [11] stated that the objectives of exploratory factor analysis are to reduce the number of variables, assess multicollinearity and correlation among factors, unidimensionality of constructs, evaluate construct validity, examine factor relationships, develop constructs, and prove proposed theories.

According to Chattopadhyay and Chattopadhyay [12] Factor analysis is a statistical technique for determining the dimensionality of a set of variables. Factor analysis seeks to discover basic variables or factors that explain the sequence of correlations within a collection of variables examined.

3. MATERIALS AND METHODS

Simple random technique was used to collect the data from the FPOs during August and September 2021. The total sample size was 60 FPO's registered in Madurai Agri Business Incubation Forum, Madurai district, Tamil Nadu, India. A questionnaire was distributed through online mode to the respondents who were Board members of the FPO. The data collected was analyzed using the Statistical Package for Social Sciences 26 (SPSS).To satisfy the objective, Exploratory Factor Analysis (EFA) was used the following statements:

The responses for the statements were measured using a five-point scale from 'strongly expected' to 'strongly not expected' (Strongly Expected=5, Expected= 4, Neutral= 3, Not Expected=2, Strongly Not Expected=1).

4. RESULTS AND DISCUSSION

Exploratory Factor Analysis was applied in this study using principal component analysis with varimax rotation. The goal of using Exploratory Factor Analysis with Principal Component Analysis is to get as much variation from the concept as possible. It covers correlation testing with Kaiser-Meyer-Olkin (KMO) and Barlett's test of sphericity.

Table 1. List of variables

Below market rate workspace
Laboratory facilities
Provision of technical assistance
Provision of marketing assistance
Provision of networking support
Assist the FPO companies in product development activities
Helps FPO companies in securing capital
Spreads information on a business idea
Helps the FPOs in conducting feasibility studies
Helps the FPO companies in business plan development
Provides business counseling to FPO companies
Create an environment, where FPO companies learn from one another.
Time to develop marketable product/services minimized
Services that reduce early-stage operational cost
Accelerates the development of the new firm
Minimizes the chances of failure of start-up firms
Helps the FPO companies to establish credibility

From Table 2 the KMO index of sampling adequacy is 0.651, indicating that the data is appropriate for factor analysis. According to Tabachnick and Fidell [13], values more than 0.5 are appropriate for factor analysis, whereas values less than 0.5 are unsuitable. From the Bartlett's test, the value of chi-square is 279.928 with the degree of freedom is 136 with significance ($p<0.000$) which demonstrating the data suitable for factor analysis.

Table 3 displays the Eigenvalue as well as the proportion of variation. Items with Eigenvalues higher than one are kept for interpretation [14]. The first component accounts for 25.37 percent of the variance, the second for 10.27 percent, the third for 9.16 percent, the fourth for 7.20 percent, the fifth for 6.97 percent, the sixth for 6.60 percent, and the seventh for 6.1 percent of the variance, with Eigenvalue more than one for all the factors. As a result, the all seven variables are retained for interpretation, which totally explained 71.69 percent of the variation.

Table 4 illustrates the rotated component matrix obtained by employing a principal component analysis technique for variable extraction using the varimax rotation method. It offers the factor loading by rotating the variables, and the higher the loading, the variable is a pure measure factor [15]. The items are rotated and grouped under a factor that is associated with one another, yielding seven factors with factor loadings greater than 0.3.

From Table.5, it is concluded that the factor1 described a Market related service requirements of FPOs which is named as Market assistance services. This factor includes the variables such as "Spreads information on the business idea" (.785), "Time to develop marketable product/services minimized" (.782), "Minimizes the chances of failure of start-up firms" (.578), "Create an environment, where FPO companies learn from one another (.549)".

Factor 2 is described as business development services needed at the beginning of the FPOs, hence, it is named as early stage business development service. This factor includes the variables such as"Helps the FPO companies to establish credibility" (.761), "Helps the FPO companies in business plan development" (.663), "Accelerates the development of new firm" (585), "Services which reduce early-stage operational cost"(.582).

Table 2. KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**.651**
Bartlett's Test of Sphericity	Approx. Chi-Square	279.928
	df	136
	Sig.	.000

Table 3. Total variance explained

Component	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	4.313	25.372	25.372	4.313	25.372	25.372
2	1.747	10.276	35.648	1.747	10.276	35.648
3	1.558	9.166	44.814	1.558	9.166	44.814
4	1.225	7.204	52.018	1.225	7.204	52.018
5	1.186	6.977	58.995	1.186	6.977	58.995
6	1.122	6.600	65.595	1.122	6.600	65.595
7	1.037	6.100	71.696	1.037	6.100	71.696
8	.825	4.855	76.551			
9	.725	4.263	80.814			
10	.713	4.192	85.006			
11	.588	3.459	88.466			
12	.470	2.763	91.229			
13	.383	2.254	93.483			
14	.352	2.068	95.551			
15	.306	1.798	97.349			
16	.249	1.463	98.812			
17	.202	1.188	100.000			
Extraction Method: Principal Component Analysis.						

Table 4. Rotated component matrix

Variables	Component						
	1	2	3	4	5	6	7
Spreads information on a business idea	.785						
Time to develop marketable product/services minimized	.782						
Minimizes the chances of failure of start-up firms	.578	.376					
Create an environment, where FPO companies learn from one another	.549		.370		.386		
Helps the FPO companies to establish credibility		.761			.323		
Helps the FPO companies in business plan development		.663	.377				
Accelerates the development of the new firm	.464	.585					
Services that reduce early-stage operational cost		.582		-.378			
Assist the FPO companies in product development activities			.816				
Helps FPO companies in securing capital	.335		.692				
Provides business counseling to FPO companies	.319	.324	.495		.413		
Provision of networking support				.797			
Provision of technical assistance				.714		.416	
Below market rate workspace					.874		
Provision of marketing assistance						.853	
Laboratory facilities							.826
Helps the FPOs in conducting feasibility studies	.443					-.375	.556
Extraction Method: Principal Component Analysis.							
Rotation Method: Varimax with Kaiser Normalization							

Table 5. Components extracted

Components	Factor Names	Variance explained	Factor Loadings	Variables
1	Business ecosystem	25.37	.785	Spreads information on a business idea
			.782	Time to develop marketable product/services minimized
			.578	Minimizes the chances of failure of start-up firms
			.549	Create an environment, where FPO companies learn from one another
2	Firm Start-ups Assistance	10.27	.761	Helps the FPO companies to establish credibility
			.663	Helps the FPO companies in business plan development
			.585	Accelerates the development of the new firm
			.582	Services that reduce early-stage operational cost
3	Business Development	11.50	.816	Assist the FPO companies in product development activities
			.692	Helps FPO companies in securing capital
			.495	Provides business counseling to FPO companies
4			.797	Provision of networking support
			.714	Provision of technical assistance
6			.853	Provision of marketing assistance
5	Infrastructural Assistance Services	2.21	.874	Below market rate workspace
7			.826	Laboratory facilities
			.556	Helps the FPOs in conducting feasibility studies

As the component 3, 4, and 6 are the services related to the business development of FPO, hence, these factors are combined into one factor and named as Business development services. The factor includes the variables such as “Assist the FPO companies in product development activities” (.816), “Helps FPO companies in securing capital” (.692), “Provides business counseling to FPO companies”(.495), “Provision of networking support” (.797), “Provision of technical assistance” (.714), “Provision of marketing assistance” (.853).

As the component 5 and 7 are related to infrastructure needs of FPO’s, so, it is merged together and named as physical infrastructure assistance. This factor includes “Below-market rate workspace” (.874), “Laboratory facilities”(.826), “Helps the FPOs in conducting feasibility studies” (.556).

5. CONCLUSION

The research was carried out to analyze the service expectation of FPO's from the Business incubator using Exploratory Factor Analysis. In order to conduct the factor analysis, 17 items are developed by referring various articles. The results revealed that four factors such as market assistance services, early stage business development services, business development services and physical infrastructural assistance are the services expected by the FPO's from the Business incubator. Hence, the Agribusiness Incubator could take efforts to provide the services expected by the FPOs for improving their performance and sustainability.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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