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Identifying the Factors Influencing the Performance of the Farmer Producer Organizations Dealing with Value Addition

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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

Aims: Identifying the factors influencing the performance of the Farmer Producer Organizations dealing with value addition.
Study Design: Exploratory research design.
Place and Duration of Study: The research was carried out in the state of Tamil Nadu. Primary data was collected from a random sample of respondents.

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Methodology: The study was conducted in the state of Tamil Nadu which examines the factors that influencing the performance of the FPOs dealing with the value-added products. The data was collected from 60 FPOs through random selection process, the sample respondents were CEOs and Board of Directors of the FPOs. Personal interview was taken to gather primary data. Exploratory factor analysis was conducted to find the factors that influence the performance of the FPOs dealing with value added products in Tamil Nadu.
Results: This study identifies that the cumulative variance accounted for by the study amounted to 56.606 percent, the factors exerting substantial influence encompass Innovative Product Development, Integration of E-Commerce, Strategic Product Pricing, Establishment of Collaborative Partnerships, Emphasis on Distinctive Branding & Packaging, Advancements in Processing Facilities, and Assurance of Product Quality. Furthermore, factors like Augmented Market Access, Effective Management of Demand-Supply Dynamics, Optimization of Inventory Holding, Accomplishments in Certification, Efficient Handling of Working Capital, and Access to Credit and Financial Support were determined to have a moderate level of influence. Lastly, factors contributing to the enhancement of Turnover Rates, Incorporation of Valuable Customer Feedback, and Pioneering Product Development were identified as having a lower degree of influence
Conclusion: From the study it can be concluded that operational factors are the most influencing factors for the performance of the FPO that contributes to the 36 percent of the contribution of the performance.

Keywords: FPO; value added product; exploratory factor analysis.

1. INTRODUCTION

In the principality of agriculture and food supply chains, the concept of value addition has emerged as a pivotal strategy to enhance the worth of products or services through a spectrum of activities. Over the years, researchers and experts have extensively explored the multifaceted dimensions of value addition and its profound impact on various stages of the agricultural value chain. Reddy et al. [1] succinctly define value addition as the process of augmenting the value of a product or service through activities encompassing processing, packaging, branding, and marketing. This holistic approach is thought to not only elevate the product's market appeal but also to stimulate economic growth and sustainability in both global and domestic markets. In the context of the burgeoning demand for fruits and vegetables, Padma and Rathakrishnan [2] emphasize the contemporary significance of value addition as a technological advancement that capitalizes on market dynamics. This evolution, rooted in the commercial utility of agricultural commodities, has prompted increased attention to value addition as a mechanism to meet market demands while simultaneously generating economic opportunities.

The organizational intricacies of farmer producer organizations (FPO's) have also come under scrutiny for their potential to optimize value chains. Pustovoitova [3] delves into the structural setup of FPO's, illuminating their role in facilitating efficient value chain analysis. This exploration lays the foundation for understanding how coordinated efforts can contribute to the successful integration of value addition practices. While the benefits of value addition are manifold, its realization necessitates comprehensive knowledge dissemination and skill acquisition. Talathi [4] underscores this by highlighting the role of training in enhancing participants' comprehension of processing methods and value-added products. Furthermore, Patel et al. [5] accentuate the practical aspect of value addition, defining it as the modification of fresh goods to make them more convenient for handling, transportation, storage, and consumption. Within the food supply chain, value addition is demonstrated to be a mutualistic endeavor. Shashi's [6] research elucidates how the implementation of value-added techniques by different stakeholders, including farmers, processors, distributors, and retailers, engenders a ripple effect of benefits throughout the chain. This collaborative approach not only streamlines operations but also reduces costs, waste, and lead times. The concept of value addition is not restricted solely to its economic ramifications; rather, it encompasses a spectrum of factors that contribute to the overall growth of agriculture. Sanal and Kumar [7] underscore the transformative impact of value addition in the transition from raw materials to finished goods.

Vijayakumar [8] further amplifies this notion through a case study analysis, highlighting the socio-economic benefits of FPO's in the Indian

context. As the agricultural landscape continues to evolve, the role of collaborative efforts becomes increasingly pronounced. Tripathy [9] explores the collaborative prowess of farmers' producer organizations (FPO's) in strengthening the agricultural value chain. Leadership's role is identified as pivotal in shaping the success of FPO's, underscoring the intricate interplay between organizational dynamics and value addition strategies. In recent research, Mishra et al. [10] employ principal component analysis to uncover key elements that positively impact value addition performance. Factors such as membership commitment, governance and management, gender inclusivity, and youth engagement are identified as influential components in this regard. This introductory synthesis underscores the intricate tapestry of value addition within the agricultural domain. From its conceptualization as a mechanism to enhance product worth to its practical implementation across diverse stages of the value chain, value addition emerges as a dynamic force propelling agricultural growth, economic prosperity, and stakeholder collaboration. As we delve deeper into the insights offered by various researchers, a comprehensive understanding of the multifaceted nature of value addition and its ramifications is set to unfold. Pant [11] examined relationship between social capital, self-efficacy, and the performance of producer organizations. Through a comprehensive analysis, the study revealed the dual impact of social capital and self-efficacy on Farmers' Producer Organizations (FPOs) in India, emphasizing their crucial roles as predictors of FPO performance [12-15].

2. METHODOLOGY

Factor analysis is a technique that is used to reduce a large number of variables into fewer numbers of factors. This technique extracts maximum common variance from all variables and puts them into a common score. As an index of all variables, we can use this score for further analysis. Factor analysis is part of general linear model (GLM) and this method also assumes several assumptions: there is linear relationship, there is no multicollinearity, it includes relevant variables into analysis, and there is true correlation between variables and factors. Several methods are available, but principal component analysis is used most commonly.

Exploratory Factor Analysis and Principal Component Analysis were used with the intention of capturing as much conceivable variety in the concept as possible. This method included analyzing correlations using Barlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) testing. Using the SPSS 26 program, factor analysis was put into practice. The implementation of factor analysis was conducted utilizing SPSS 26 software.

3. RESULTS AND DISCUSSION

3.1 Findings Related with Factors Influencing the Performance of FPOs

3.1.1 List of statements

Table 1. List of statements

S. No	Statement
1	Innovative Product Development
2	E-Commerce Integration
3	Strategic Product Pricing
4	Collaborative Partnerships
5	Distinct Branding & Packaging
6	Advanced Processing Facilities
7	Product Quality Assurance
8	Enhanced Market Access
9	Demand-Supply Management
10	Optimized Inventory Holding
11	Certification Achievements
12	Effective Working Capital
13	Credit and Financial Support
14	Turnover Rate Enhancement
15	Valuable Customer Feedback

Table 2. KMO and bartlett's test

Kaiser-meyer-olkin measure of sampling adequacy		.730
Bartlett's Test of Sphericity	Approx. Chi-Square	376.590
	Df	105
	Sig.	.000

Table 2 indicated that the KMO statistic had yielded a value of 0.730 (> 0.5), which indicated the sufficiency and suitability of the sample for conducting factor analysis. In the instance of Bartlett's test, the observed approximate chi-square statistic had been 376.590, with 105 degrees of freedom, and had shown significance at the 0.000 level. Consequently, it could be deduced that Factor Analysis was a recommended and appropriate technique for further data analysis.

3.1.2 Total variance explained

The utilization of the principal component analysis (PCA) method had allowed for the exploration of how factors and variables interacted within the analysis framework. Referred to technically as factor loadings, these interactions had revealed the interconnections among variables. However, despite these factor loadings having improved the understanding of variable relationships, they might not have clearly classified all variables within their respective factors. Table 3 had unveiled a notable observation: three components had exhibited Eigenvalues exceeding unity. Collectively, these three components had elucidated around 56.606 percent of the variance.

3.1.3 Component matrix

Based on Table 4, one could deduce that cross loadings were achieved. However, to derive a meaningful conclusion regarding the grouping of variables under specific factors, the rotation of components had been performed using varimax rotation with Kaiser Normalization.

3.1.4 Rotated component matrix

Table 5 revealed that factor loadings were acquired subsequent to varimax rotation. Factor loadings that were equal to or greater than 0.5 were considered significant. The first component had displayed 7 factor loadings with eigenvalues exceeding 0.5, whereas the second component had shown 5 factor loadings meeting this criterion, and the third component had exhibited 3 factor loadings with eigenvalues surpassing 0.5. These components had been appropriately labeled based on their underlying factors.

Table 3. The utilization of the principal component analysis

Component	Initial Eigen values			Extraction sums of squared loadings		
	Total	**% of variance**	**Cumulative %**	**Total**	**% of variance**	**Cumulative %**
1	5.516	36.770	36.770	5.516	36.770	36.770
2	1.559	10.395	47.165	1.559	10.395	47.165
3	1.416	9.441	56.606	1.416	9.441	56.606
4	1.116	7.437	64.043			
5	1.014	6.759	70.802			
6	.831	5.540	76.342			
7	.693	4.622	80.964			
8	.584	3.896	84.860			
9	.531	3.538	88.398			
10	.449	2.996	91.394			
11	.429	2.857	94.251			
12	.207	1.381	97.792			
13	.189	1.263	99.055			
14	.093	.623	99.678			
15	.048	.322	100.000			

Extraction Method: Principal Component Analysis

Table 4. Component matrix

	Factors	Component 1	Component 2	Component 3
1	Innovative Product Development	.637	.167	.215
2	E-Commerce Integration	.426	.575	-.062
3	Strategic Product Pricing	.254	.688	-.146
4	Collaborative Partnerships	.037	.768	.036
5	Distinct Branding & Packaging	.174	.733	.436
6	Advanced Processing Facilities	.221	.595	.488
7	Product Quality Assurance	.195	.111	.691
8	Enhanced Market Access	.448	.452	.530
9	Demand-Supply Management	.627	.008	.488
10	Optimized Inventory Holding	.615	.111	.331
11	Certification Achievements	.685	.121	.002
12	Effective Working Capital	.730	.299	-.084
13	Credit and Financial Support	.681	.131	.089
14	Turnover Rate Enhancement	.310	.297	-.566
15	Valuable Customer Feedback	.619	.332	-.017

Table 5. Rotated component matrix

	Factors	C 1	C 2	C 3
1	Innovative Product Development	.637		
2	E-Commerce Integration		.575	
3	Strategic Product Pricing		.688	
4	Collaborative Partnerships		.768	
5	Distinct Branding & Packaging		.733	
6	Advanced Processing Facilities		.595	
7	Product Quality Assurance			.691
8	Enhanced Market Access			.530
9	Demand-Supply Management	.627		
10	Optimized Inventory Holding	.615		
11	Certification Achievements	.685		
12	Effective Working Capital	.730		
13	Credit and Financial Support	.681		
14	Turnover Rate Enhancement			-.566
15	Valuable Customer Feedback	.619		

3.1.5 Components and factor

According to Table 6, it was evident that the first component, referred to as "operational services," had encompassed attributes such as procuring products at prices exceeding market rates, leadership qualities, cooperative dynamics among members, regular procurement practices from farmers, profit-sharing mechanisms, and meticulous database upkeep containing details like names, land holdings, locations, cultivated crops, and estimated supply. This component had manifested a variance of 36.770 percent. In the same vein, the second component, labeled as "service providing," had encapsulated activities such as supplying inputs to farmers, provisioning infrastructural support, leveraging digital marketing for branding and sales, engaging E-commerce platforms for sales, and maintaining financial transaction transparency. This component had accounted for a variance of 10.395 percent. Lastly, the third component, designated as "finance," had encompassed factors including FPO turnover, received grants, access to credit, and the count of members engaged in FPO-mediated sales. This component had reflected a variance of 9.44 percent.

Table 6. Components and factor

Components	Factor names	Variance explained	Factor loadings	Variables
1	Operational Factors	36.770	.637	Innovative Product Development
			.627	E-Commerce Integration
			.615	Strategic Product Pricing
			.685	Collaborative Partnerships
			.730	Distinct Branding & Packaging
			.681	Advanced Processing Facilities
			.619	Product Quality Assurance
2	Marketing Factors	10.395	.575	Enhanced Market Access
			.688	Demand-Supply Management
			.768	Optimized Inventory Holding
			.733	Certification Achievements
			.595	Effective Working Capital
			.575	Credit and Financial Support
3	Financial Factors	9.44	.691	Turnover Rate Enhancement
			.530	Valuable Customer Feedback
			-.566	Innovative Product Development

4. CONCLUSION

The investigation yielded a conclusion that entailed the extraction of three components, each displaying Eigen values surpassing 1. The cumulative variance accounted for by the study amounted to 56.606 percent. As a result of this inquiry, it can be deduced that the factors exerting substantial influence encompass Innovative Product Development, Integration of E-Commerce, Strategic Product Pricing, Establishment of Collaborative Partnerships, Emphasis on Distinctive Branding & Packaging, Advancements in Processing Facilities, and Assurance of Product Quality. Furthermore, factors like Augmented Market Access, Effective Management of Demand-Supply Dynamics, Optimization of Inventory Holding, Accomplishments in Certification, Efficient Handling of Working Capital, and Access to Credit and Financial Support were determined to have a moderate level of influence. Lastly, factors contributing to the enhancement of Turnover Rates, Incorporation of Valuable Customer Feedback, and Pioneering Product Development were identified as having a lower degree of influence.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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