



# TESTING THE IMPACT OF THE SUCCESS FACTORS ON PROJECT COSTS AND FINAL GOODS QUALITY THROUGH PRODUCT MIX STRATEGY: AN EMPIRICAL APPROACH

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## Abstract

*Globalization has given rise to increased competition faced by manufacturers and distributors in the markets across the world. Consequently, it is essential for organizations engaged in various industries to adopt a sustainable practice of marketing their products and services. In this regard, it can be sketched that along with product mix strategy; firms must also understand the implications of raw material-related factors on the cost and quality of the products, especially the Agri-Nutrient firms. Hence, this study aims at comprehending the mediating role of product mix strategy in the relationship between raw material variables with the constructs of project costs and final goods quality in the Agri-Nutrient industry. For accomplishing this purpose, the study conducted a quantitative survey using a self-developed questionnaire, the reliability of which was tested by Cronbach alpha ( $\alpha = 0.626$  to  $0.734$ ). The sample was 300 individuals associated with the Agri-Nutrient industry. The findings revealed that the constructs of raw material-related factors had a significant impact on the quality of the final goods but an insignificant impact on the cost of the projects. The product mix strategy was found to impact the quality of the final goods and the project costs.*

*Keywords: Product mix strategy, Raw material variables, Project costs, Quality final goods, Agri-Nutrient industry*

## INTRODUCTION

In the current global competitive environment, the goal of every organization is to achieve a competitive edge in the market. Competitive advantage facilitates an organization to differentiate its products through better quality, lower price, and more. In turn, it helps create superior value for its customers and serve them with better products and services than their competitors (Porter, 2008). Similarly, distribution channels are also eminent for the organization. They help increase the availability of its products and services and accentuate that they highlight the critical features via the promotion process. Thus, organizations undertake every bit of the effort towards improving customer satisfaction and increasing loyalty. However, this can only be done by attracting their attention towards the distinct characteristics of the product or service offered. This is conducive to increase the market share of the organization's products. Moreover, it is also instrumental in building a profitable relationship with customers, which further helps ensure the organization's sustainability (Al Badi, 2018).

To ensure the sustainability of the organizations engaged in the Agri-Nutrient industry, it is eminent that they adopt an appropriate product mix strategy. Product mix strategy is an essential element of the marketing mix that aims at placing and highlighting the product's key characteristics in a fashion that attracts excellent demand from the consumers. Thus, it plays a pivotal role in generating value and satisfaction for the customer. Specifically, the marketing mix or 4Ps (Product, Price, Promotion, and Place) are the significant forces that help meet the customers' demands and create a long, profitable relationship with them. Many scholars have highlighted the importance of adopting a strategic business strategy in contrast to a marketing mix strategy for the better growth of the organization (Abraham, 2013; Ansong and Boateng, 2019). However, findings have elucidated that the business development strategy is inadequate to deliver unique value to meet customers' needs. The same is applicable even in the field of agricultural fertilisers. Fertilisers are necessary to add the nutrients that crops remove from the soil (Hedley, 2015). However, the absence of fertilisers adversely impacts crop yields and agricultural productivity. Consequently, the decrease in raw materials will significantly impact the production cost and quality of the final goods. Thus, the current study aims at comprehending the mediating role of product mix strategy in the relationship between raw material variables with the constructs of project costs and final goods quality in the Agri-Nutrient industry.

### Aim of the Study

The main aim that drives the current study is to understand the mediating role of product mix strategy in the relationship between raw material variables with the constructs of project costs and final goods quality in the Agri-Nutrient industry.

## Objectives of the Study

In order to accomplish the above, the study will focus on fulfilling the above objectives:

1. To understand the concept of project mix strategy.
2. To identify the impact of raw material variables like gas availability, supply agreement, and affordable pricing in the Agri-Nutrient Industry.
3. To evaluate the impact of raw material variables on the project costs and final goods quality in the Agri-Nutrient Industry.

## LITERATURE REVIEW

### Concept Of Product Mix Strategy

Marketing of products involves many elements of the marketing mix that are taken care of individually. The marketing mix is the fundamental concept of marketing. It is defined as a set of controllable marketing tools that an organization uses for gaining the desired response from the targeted audience (Kotler, 2012). Moreover, the tools of the marketing mix are tactical, fundamental, and apprehensible. Product, Price, Place of distribution, and Promotion are the key ingredients of the Marketing mix. These ingredients are also known as the Four P's of Marketing (Khan, 2014).

According to Rui Fernandes, Joaquim B. Gouveia, Carlos Pinho (2012), there is a difference between the technology evaluation and the potential value due to product mix adaptations that can provide the maximum return from investment. The product mix includes a complete assortment of products that a brand offers to its consumers (Thabit and Raewf, 2018). The product mix is also referred to as product assortment or product portfolio. It takes into account the entire product lines offered by a company. A company may have a single or multiple product line. In such a situation, when an organization offers multiple products, they may or may not concern with the product mix. For instance, a company might offer two products, such as a school bag and stationery items. These products are used for a similar purpose, and thereby, related to one another. On the contrary, if the company offers a school bag and detergent, these products are unrelated as they are used for different purposes altogether (Keth, 2015).

With reference to the agribusiness industry, implementing effective marketing management practices is essential to ensure better growth and development. Utilizing the correct product mix strategy by the fertiliser industries will be conducive to attaining the desired growth in agricultural income, which will further help adopt new agricultural practices (Thaker, 2012). This is mainly because the agriculture industry is subject to market and climate turbulence. In this regard, Pathak, Pushkar, and Sanjay (2014) add that the marketing environment is not stable and is subject to ad-hoc fluctuations due to growing competition.

Consequently, companies engaged in the fertiliser sector face several issues about promoting their products, coordination, service, research and development activities, environment, and more. Hence, implementing a successful product mix strategy facilitates an organization to direct its efforts and efficiently allocate resources on the products and product lines it offers to attain the most significant potential for its growth, market share, and revenue (ProductPlan, 2020).

### **Influence Of Raw Material On Final Product Quality**

Hill, Schilling, and Jones (2016) highlighted superior quality as one of the four building blocks essential for building a competitive advantage. Zugarramurdi et al. (2004), in their study, highlighted that significant challenges encountered by developing countries are to address the foreign consumer expectations and particularly with superior quality. A lack of adequate infrastructure and technical expertise often acts as the root cause for quality defects. This, in turn, results in rejection and low prices for exports, leading to significant financial losses. Thereby, the quality of the raw material is the critical factor that translates into a better quality of the final product.

Twin (2019) outlined that marketers need to understand the product's life cycle and execute the plan appropriately to promote their life cycles for focusing on the adequate placement of the final product. In concern to the Agri-Nutrient industry, Ghayur (2000) highlighted that several factors influence the marketing of Agri-Nutrient products (fertilisers) in India. Such factors comprise the perceptions of the agriculturalists, quality of the product, government policies, application of fertilisers into the farms, among other things. This implies that due to the poor quality of raw materials such as fertilizer, farmers refrain from using them in large quantities, affecting the overall quality of agricultural production.

### **Influence Of Raw Material On The Project Cost**

Clews (2016) highlighted that the availability and cost of raw materials is a significant factor in determining the success of a petrochemical project. He further noted that the cost of raw materials strongly influences the cost competitiveness of a project. In their study, Wilting and Hanemaaijer (2014) highlighted that the pricing policy of the raw materials is strategically impacted by the energy and material costs that the producer incurred in developing the raw materials. Moreover, the costs incurred in the development of the raw materials are not equivalent to the price of the raw materials. This is mainly because the producers of the raw materials are likely to add a certain margin of profit that depicts their income on the production. In addition, the energy and materials include other costs incurred during processing along the

chain, such as those related to labour and transport, which leads to an increase in raw materials prices, further impacting the cost of the products.

Furthermore, CARE Ratings (2020) published a report regarding the Indian Fertiliser Industry that depicted monsoon and panic accounts as crucial elements that affect the cost of agricultural production and the essential supplies required for its production. The report further outlined that due to the current pandemic, farmers have been keen on accumulating raw materials and fertilisers; they are uncertain about the future situation regarding the availability of the same. This implies that the cost of the final goods will also be affected due to such hoarding and uncertainty about the near future. Thus, it can be stated that lack of availability of raw materials or higher cost of raw materials is likely to impact the overall cost of the product.

### Conceptual Framework

The conceptual framework below is derived through the above review of the literature. The framework depicts the factors affecting the success of the projects and their impact on the cost of the projects and the quality of the final goods. Moreover, the study will gauge the mediating role of product mix strategy in this relationship.

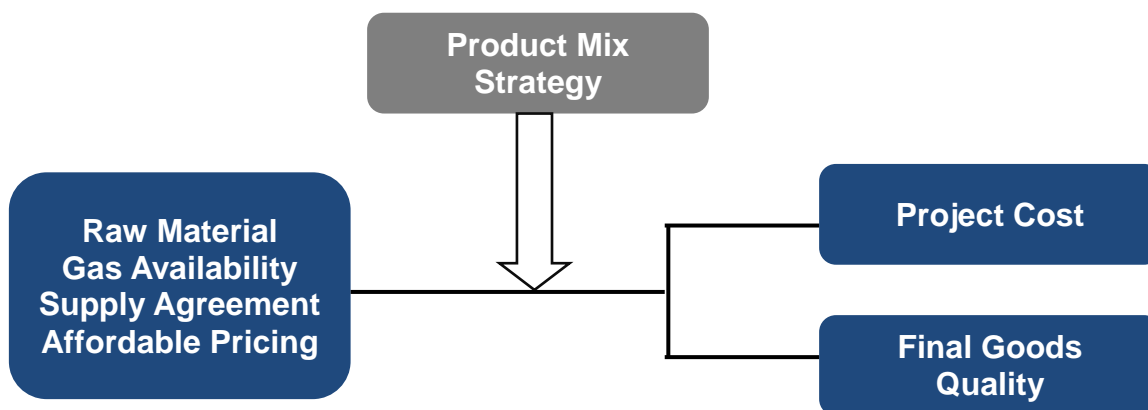


Figure 1: Conceptual Framework

The success of the projects in the Agri-Nutrient industry is accentuated to be determined by four sub-variables. These sub-variables consist of raw materials, gas availability, supply agreement, and affordable pricing and account as independent variables. Further, project cost and quality of the final goods are the dependent variables of the study. Lastly, the Product Mix strategy is the mediating variable of the study.

## The Hypothesis Of The Study

Based on the above literature review and conceptual framework, the following hypotheses have been developed.

H0: The success of the projects is not affected by the cost of the projects.

H1: The success of the projects is affected by the cost of the projects.

H0: The quality of the final goods does not impact the success of the projects.

H2: The quality of the final goods impacts the success of the projects.

H0: Product Mix Strategy does not have a significant impact on the quality of the final goods.

H3: Product Mix Strategy has a significant impact on the quality of the final goods.

H0: Product Mix Strategy does not have a significant impact on the cost of the projects.

H4: Product Mix Strategy has a significant impact on the cost of the projects.

H0: The project's cost does not impact the quality of the final goods.

H5: The cost of the project has a significant impact on the quality of the final goods.

## METHOD

Research Methodology is an essential part of the research framework as it guides the entire study. The current study adopted a positivist research philosophy or paradigm. The Positivist research paradigm accentuates the idea that sense experience and empirical evidence are the scaffolds for attaining knowledge and conducting research. As a result, it will aim to collect empirical data from the most concerned individuals to improve human society (Park, Konge, and Artino, 2020). In alignment with this, the current study adopted a quantitative research approach as empirical evidence is most accurate in this case. The quantitative research approach will help acquire precise information as the study does not aim to explore or develop new concepts and relationships (Apuke, 2017).

Further, the study utilized a descriptive research design. Descriptive research design helps outline the data acquired and analyzed in a manner that showcases how events independently occur in nature (Rahi, 2017). Moreover, the study used a deductive reasoning approach to outline the results of the study. The deductive reasoning approach utilizes a top-to-bottom approach wherein it discusses the most generalized information or theory followed by the study's specific outcomes (Oaksford, 2015). The current study acquired primary data through a survey-based questionnaire technique. The questionnaire used for the study was self-developed. The data was collected from the employees working in the Agri-Nutrient Industry

and members of Industry Associations. The study used a simple random sampling technique. Data was collected from 300 employees and was analyzed using AMOS and SPSS software.

The current study strategically utilized a 20-items scale to gain responses from the employees. In addition, Cronbach's Alpha reliability statistics were used to delineate this information. The table below depicts the reliability statistics acquired concerning each dimension.

Table 1: Cronbach's Alpha reliability statistics

Variables	Cronbach's alpha ( $\alpha$ )
Controllable factors impacting the success of a project	0.725
Mediating factors impacting the success of a project	0.734
Factors impacting the cost of the project	0.626
Factors impacting the quality of the goods produced	0.664

The reliability in statistics is determined by using Cronbach's alpha ( $\alpha$ ). The Cronbach's alpha in this research ranged from 0.626 to 0.734, indicating that it is deemed highly reliable. As a result, all the items were considered for further analysis.

## RESULTS AND DISCUSSION

### Demographic Information

Total population considered for the study was 1200. Utilizing the Raosoft sample size calculator, the total sample chosen was 300.

Table 2: Demographic Distribution

	Frequency	Percent	Cumulative Percent
<b>Gender</b>			
Female	63	21.0	21.0
Male	237	79.0	100.0
<b>Years of Experience</b>			
Below one year	51	17.0	17.0
1 – 5 years	64	21.3	38.3
5 – 10 years	91	30.3	68.6
10 – 15 years	63	21.0	89.6
Above 15 years	31	10.4	100.0



The above table delineates the demographic information of the respondents. In this regard, the gender of the respondents was inquired. It was revealed that 79.0% of the respondents were males, while 21.0% of the remaining respondents were females. Further, the years of experience of the respondents were inquired. In this regard, it was comprehended that most of the respondents had experience ranging from 5 – 10 years. These respondents accounted for 30.3% of the total sample size. Followed by this, it was found that 21.3% of the respondents had experience ranging from 1 – 5 years. 17.0% of the respondents were found to have an experience of less than one year. Moreover, 21.0% of the respondents were found to have experience of 10 – 15 years. Lastly, it was found that 10.4% of the respondents had the highest level of experience, corresponding to more than 15 years.

### Factor Analysis

When all the items were forced to form a single factor, the factor analysis could extract five components with a variance of 53.141%. All the items had a factor loading of more than 0.4. Hence all the items were considered for further analysis.

Table 3: Rotated Component Matrix<sup>a</sup>

	Component				
	1	2	3	4	5
<b>Controllable factors impacting the success of a project</b>		.681			
Q21. The expertise with project finance determines the success of a business model in terms of efficiency.					
Q22. The technical expertise employed ensures the success of a project.		.696			
Q23. Raw material availability is essential for the project's success.		.726			
Q24. Selection of the right technology is essential for the project's success.		.722			
Q25. Proper project scheduling and risk analysis can enhance the probability of success of a project.		.583			
<b>Mediating factors impacting the success of a project</b>		.672			
Q31. Geographical distance of end markets impact the success of a project to a great extent.					



Q32. Environmental policies related to raw material utilized govern the success of a project.	.723	
Q33. Changing market dynamics affect the success of a project.	.704	
Q34. Regulatory approvals impact the success of a project to a great extent.	.663	
Q35. Climate impacts the success of a project to a great extent.	.599	
Q36. Product mix viability analysis assists in the prediction of the success of a project.	.485	
<b>Factors impacting the cost of the project</b>	<b>.784</b>	
Q41. Proximity of raw material availability can impact the project cost.		
Q42. Product mix has an impact on the project costs.	.759	
Q43. The selection of the raw material supplier impacts the project costs.	.730	
Q44. Selection of the technology influences the cost of the project.	.428	.612
Q45. Supply agreements affects the cost of the project.		.753
<b>Factors impacting the quality of the goods produced</b>	<b>.739</b>	
Q51. An experienced workforce is critical for maintaining the requisite product quality parameters.		
Q52. The composition of the raw materials affects the quality of the goods produced.	.788	
Q53. The availability of raw materials impacts the quality of goods to a great extent.	.691	
Q54. Imparting appropriate training assist in improving the quality of goods produced.		.583
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 5 iterations.		

### Preliminary Model

The path diagram for the preliminary model, which was used for confirmatory factor analysis, was as follows.

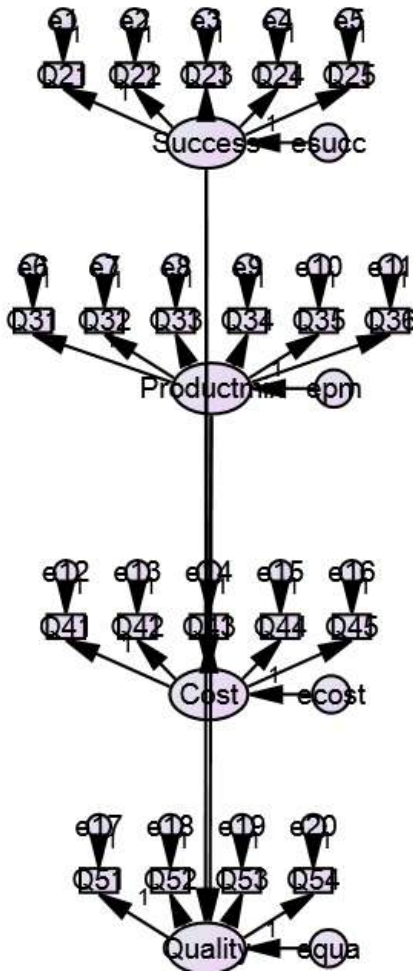


Figure 2: Preliminary Model

**Model Fit Indices**

Table 4: Model Fit Indices

	Model fit	Desired score
<b>Chi-Square</b>	272.123	NA
<b>Degrees of Freedom</b>	166	NA
<b>CMIN/DF</b>	1.639	$\leq 2.00$ for good fit and 2.00 – 5.00 for moderate fit.
<b>CFI</b>	0.895	Close to or more than 0.90 for good fit
<b>RMSEA</b>	0.046	$\leq 0.10$ reflects good fit
<b>NFI</b>	0.773	A value close to 0.90 reflects a good fit

The table above shows that the Chi-Square value was 272.123, DF was 166, and the CMIN/DF was 1.639, indicating a good fit model. Furthermore, the CFI was 0.895, which is

close to 0.9, and RMSEA was 0.046 indicating a good fit. Finally, the value of NFI was close to 0.9, indicating a moderate fit.

### **Validity**

The principal component analysis was carried out to reduce a large data set to obtain a meaningful smaller set of constructs. Multi-item constructs measured each variable used in the analysis by factor analysis with varimax rotation to check the unidimensionality among the items. The constructs included in the confirmatory factor analysis had Cronbach's alpha of more than 0.6.

The Cronbach's alpha indicated the internal consistency between the constructs, and it is deemed to be good. All the items included in the analysis had factor loadings of 0.4. Hence this indicated the assessment and validation by using the discriminant and convergent validity. The convergent validity was also assessed using the factor loadings of latent constructs with a significant p-value of less than 0.001. This test supported that the constructs had convergent validity.

The discriminant validity indicated by correlation matrix where most of the constructs had a correlation coefficient of less than 0.85 and by using the path analysis where the correlations among the latent constructs were less than 1.

### **Confirmatory Factor Analysis**

A preliminary model was set for confirmatory factor analysis by using AMOS. AMOS took 5 iterations for model minimization. The preliminary model allowed the researcher for its best fit as per parsimony and substantive meaningfulness. The model fit indices indicated how the underlying structure fits the data. The model was evaluated by using the model fit indices, including Chi-Square statistic, Degrees of Freedom (DF), CMIN/DF, CFI, and RMSEA.

### **Measurement Model**

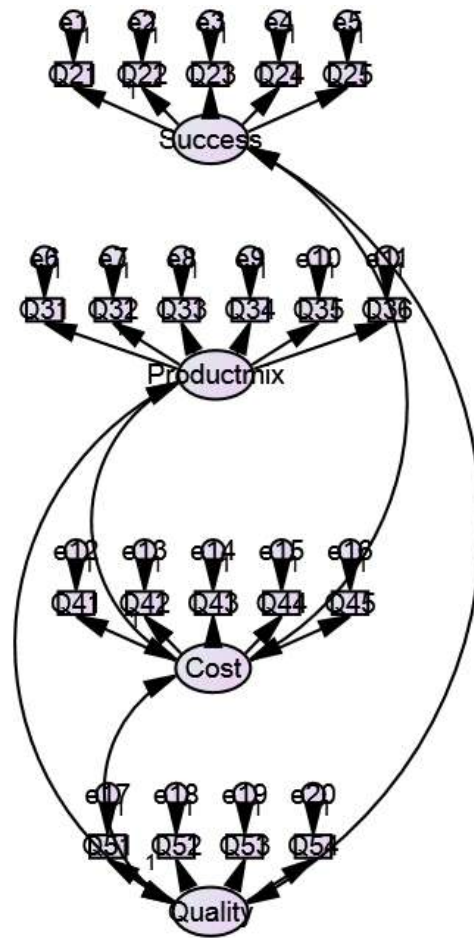


Figure 3: Measurement Model

**Model Fit Indices**

Table 5: Model Fit Indices

	<b>Model fit</b>	<b>Desired score</b>
<b>Chi-Square</b>	270.134	NA
<b>Degrees of Freedom</b>	165	NA
<b>CMIN/DF</b>	1.637	</=2.00 for good fit and 2.00 – 5.00 for moderate fit.
<b>CFI</b>	0.896	Close to or more than 0.90 for good fit
<b>RMSEA</b>	0.046	</=0.10 reflects good fit
<b>NFI</b>	0.775	A value close to 0.90 reflects a good fit

The table above shows that the Chi-Square value was 270.134, DF was 165, and the CMIN/DF was 1.637, indicating a good fit model. In addition, the CFI was 0.896, which is close to 0.9, and RMSEA was 0.046 indicating a good fit. However, the values of NFI were close to 0.9, indicating a moderate fit.

## Hypotheses Testing

Table 6: Covariances

			Estimate	S.E.	C.R.	p-value	Label
Success	<-->	Quality	.075	.026	2.913	.004	Null Hypothesis Rejected
Cost	<-->	Quality	.064	.029	2.182	.029	Null Hypothesis Rejected
Product mix Strategy	<-->	Quality	.059	.023	2.519	.012	Null Hypothesis Rejected
Product mix Strategy	<-->	Cost	.111	.032	3.512	.0001	Null Hypothesis Rejected
Success	<-->	Cost	.009	.029	.311	.756	Null Hypothesis Accepted

The above table outlines the covariances between the four constructs of the study. These dimensions consist of the success of the projects, Costs of the projects, Quality of the final goods, and Product Mix Strategy. The first dimension aims at measuring the relationship between the Success and Quality of the final goods. In accordance with this, it was found that the p-value acquired was 0.004, which is less than 0.05 level of significance. It can be concluded that the study rejects the null hypothesis and accepts the alternative hypothesis. Hence, it can be stated that the quality of the final goods impacts the success of the projects.

Further, the second dimension measures the relationship between the cost of the projects and the quality of final goods. Statistics acquired in this regard illustrated that the p-value acquired was 0.029, which is less than 0.05 level of significance. It can be concluded that the study rejects the null hypothesis and accepts the alternative hypothesis. Consequently, it can be stated that the quality of the final goods has a significant impact on the cost of the projects.

The third dimension measures the relationship between Product mix strategy and the quality of the final goods. In accordance with this, it was found that the p-value acquired was

0.012, which is less than 0.05 level of significance. It can be concluded that the study rejects the null hypothesis and accepts the alternative hypothesis. Consequently, it can be stated that the Product Mix Strategy has a significant impact on the quality of the final goods.

The fourth dimension measures the relationship between the Product mix strategy and the cost of the projects. Statistics acquired in this regard illustrated that the p-value acquired was 0, which is less than 0.05 level of significance. It can be concluded that the study rejects the null hypothesis and accepts the alternative hypothesis. Consequently, it can be stated that the Product Mix Strategy has a significant impact on the cost of the projects.

The fifth dimension measures the relationship between the Success and Cost of the project. In this regard, it was found that the p-value acquired was 0.756, which is more than 0.05 level of significance. It can be concluded that the study accepts the null hypothesis and rejects the alternative hypothesis. Thus, it can be stated that project success is not affected by the project cost.

## CONCLUSION

The study's findings revealed that the constructs of raw material-related factors had a significant impact on the quality of the final goods. This implies that the finding was in alignment with the study conducted by Zugarramurdi et al. (2004) and Hill, Jones, and Schilling (2016). However, these factors had an insignificant impact on the cost of the projects. Thus, this finding was inconsistent with the prior literature (Wilting and Hanemaaijer, 2014; CARE ratings, 2020). Moreover, the study found that the product mix strategy impacts the quality of the final products and the cost of the projects. Thus, it can be recommended that the product mix strategy can help in enhancing the quality of the products and lower the cost of the projects, thereby aiding the organization to attain a competitive edge in the market.

The Agri-Nutrient industry must develop in order to strive in the competitive marketplace. In such a scenario, the organizations in the Agri-Nutrient industry must either plan their business models or revise the existing models for ensuring sustainable performance. Hence, in this regard, it can be recommended that future research should be conducted on how factors like project finance, price estimation, EPC contract, offtake agreement, and more can impact the success of an Agri-Nutrient project. Additionally, future research should also be undertaken to outline the role of factor audit in the success of an Agri-Nutrient project.

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