VALUE –ADDITION AND TECHNOLOGICAL ADAPTATION TO REDUCE THE PRICE SPREAD IN DEVELOPING COUNTRIES: FOCUS ON THE DAIRY INDUSTRY OF BANGLADESH

Mohammad Sirajul Islam, Ph.D

Assistant Professor Department of Business Administration Southern University Bangladesh

ABSTRACT

The agricultural sector represents a vulnerable and significant division of an economy in the developed or developing economy. This sector has been performing for meeting the fundamental rights of the humanity from beginning to date. Many challenges and uncertainties have been faced and overcome by the contributors' industries symmetrically. The aim of this study is to expand the contribution of value-addition and technological adaptation for reducing the price spread of agricultural product like liquid milk in the developing countries particularly Bangladesh. A qualitative research design has been chosen and a content analysis is applied for evaluation of the research objectives. Finally, two cases were presented to substantiate the research findings, according to research intent. The study explored that value-addition and technological adaptation by the farmers like dairy farms substantially contributed to reduce the price spread of sample industry. The study examined the present status of price spread and found 36.51% (cooperative market) and 30.77% (Noncooperative market) price spread in the sample areas. In addition, the study found 75% respondents have validated the significance of value addition to reduce the price spread and 68.75% respondents confirmed the importance of technological adaptation for reducing price spread in a developing country particularly in the dairy industry of Bangladesh. The study has also highlighted a few managerial implications and future research guidelines.

Keywords: Value Addition, Technological Adaptation, Price Spread, Dairy Industry and Developing Countries

INTRODUCTION

Problem Statement

In the agricultural sector, price spread and financial instability exist in a horizontal axis. It has been found as an inter-related problem in any economic status of state or country. Developed economies have overcome this situation through their extensive researches and diversification of strategies. Regrettably, developing economies have faced these issues as recurring hitches for sustainable development of the agricultural sector, particularly the dairy industry. In developing countries, price spread is relatively an uncomfortable situation for the policy makers and stakeholders as well. In Bangladesh, 43% price spread occurred in the dairy industry (Kamal & Islam, 2012).

In addition, others also reported that farmers did not enjoy the fair price of their produces in the dairy industry of Bangladesh particularly in the rural areas of Bangladesh. This unjustified behavior of the channel members with the farmers is really repulsive and intolerable. The dairy product is highly perishable among the list of agricultural products. Marketing of the dairy product like liquid milk is highly challenging and complex due to lack of technological adaptation by the farms. In this unprivileged situation, farmers do not store and preserve the products for bargaining with the buyers and channel members. That might be major cause of price spread of an agricultural product like liquid milk in developing countries. The reasons behind price spread in the agricultural sector is a concerning issue to the academia, policy makers and politicians with regard to ensure the sustainable development of the agricultural sector. Price spread delineates the price dispersion that forces the farmers to enjoy only a portion of the market price of the product. The farm to retail, price spread is the gap between the farm price and the retail price of food, reflecting charges concerned with the marketing activities. Academia and professional in the line recognize that state price spread is a unique and vibrant issue in the paradigm of agricultural marketing. Thus, minimization of the price spread and ensuring the fair price of the agricultural producers in developing countries is important to protect the interest of producers and consumers. But, existing research does not explore any specific and comprehensive measures for overcoming this problem of agricultural product, particularly in the dairy sector in Bangladesh. That research gap has motivated the researcher to conduct the research on the specific issues as mentioned in the title of the study. This study intends to examine the contribution of the value-addition and technological adaptation for reducing price spread in the dairy product in the developing countries like Bangladesh.

LITERATURE REVIEW

Price Spreading

Marketing activities have underlying causes for the price spread that is critical to optimize the marketing return to ensure remunerative prices to the producers (Narayanan & Bastine, 2004). An inefficient marketing practice and poor market infrastructure are the major causes of the price spread in the developing countries (Shrestha, 2013). Focus on price spread for research is exceedingly imperative to uncover many aspects of marketing and price structure as well as the effectiveness of the marketing system. Many research studies concentrated on price spread and marketing strategies of agricultural products, such as Ugwumba & Okoh (2010); Haridoss & Chandran (1996); Yasodha & Padmanabhan (1996) and Nair (1987). Major portion of empirical studies recommended that higher price spread results in a lower share of the final price to the producer that is not an expected condition in the market or society. In addition, empirical studies recommended creating utilities: like time, place, form and possession for the produce. Producers can adopt value-addition technology either at the individual level or on a collective/co-operative basis to reduce the role of intermediaries and thereby reduce the price spread. Furthermore, Narayanan & Bastine (2004) recommended that value addition at the farm-level may assist the farmers' to secure a privileged amount of the final product price and reduce the price spread. Furthermore, Kamal & Islam (2012) conducted a study on the dairy industry in Bangladesh that explored the price spread issue and identified its background. Meanwhile, these justifications have focused the delineations and comprehensive evaluations of the causes and outcomes of the price spread in the diverse industries particularly in the dairy industry of Bangladesh.

Value –addition of Agricultural Product

Value-addition is a supplementary task for changing the products or creating the utilities with regard to the target customer's choices. It is said as a signature of modification of a product from its origin which can help to provide the expected benefits to the market as well as society. Value-added agriculture delineates the manufacturing processes that increase the value of primary commodities and conversion of raw products to the expected product. Value-added agriculture may also refer to increasing the economic value of a commodity through particular production processes, e.g., organic produce, or through regionally branded products that increase the consumer appeal and willingness to pay a premium over similar but undifferentiated products. Fleming (2005) exposed that value – addition is the action of adding value to a product. It involves taking any product from one level to the subsequent level. In addition, from the farmers' side, value-addition has an importance for transforming a non-profitable enterprise into a

profitable one. But, it is critical to the long-term survival of most of the small farms.

Value-addition is merely a course of action for adding value to a product, whether firms have grown the initial product or not. It involves taking any product from one level to the next. For farmers, value-addition is a significant task and it offers a strategy for transforming an unprofitable enterprise into a profitable one. In fact, there are very few items that a Hawaii small farmer can produce and sell profitably at the first level (open wholesale market). Therefore, a value-added strategy is critical to the long-term survival of most of the small farms in the developing countries like Bangladesh.

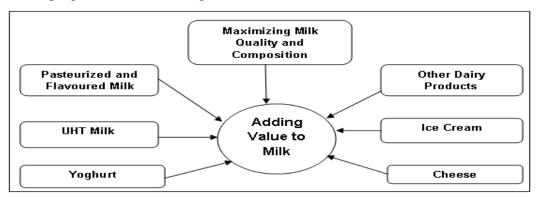


Figure 1: Diversity of dairy products that can add value to raw milk Source: Field study

TECHNOLOGICAL ADAPTATION

Technology delineates the uses of scientific knowledge to attain practical objectives in the industry, machinery and equipment development from the application of scientific knowledge. The intent of technology is application of information in the planning, production and utilization of the goods and services as well as in the organization of human activities. Innovative production technologies are generally turned as competitive weapons (Proter, 1985; Skinner, 1986). New technological innovation and uses result in the growth of production, productivity, and competitiveness of a firm. Adaptation is a decision (Klein & Knight, 2005); for using and doing any specific tools, customs and philosophies. This is difficult to empirically substantiate the terminology of the 'technological adaptation'. But, extensive review of the earlier studies on the relevant field has enlightened that technological adaptation is a decision for using technology in the regular operations of the individual or organizations for attaining better performances and achieving any particular relating to competitive advantages. It has enclosed the judgments and reviews of the technological adaptation in the

dairy industry for reducing the price spread. Many earlier studies discussed that technological adaptation plays an extensive role in sustaining productivity and growth in the agricultural sector. A slow but steady gain continues to be achieved in maximum experiment yields per unit area; total factor productivity is also accelerated; has added valuable producer and consumer traits that have served to broaden the adaptation of high by yielding varieties, stabilize production, and boost profitability; the expansion of intensively cropped area include investments in irrigation, rapid mechanization, and changes in market access and demand; responding to rising wages, farmers have steadily substituted mechanical power for labor. Technological adaptation by farms in the dairy industry contributed to the higher yielding, production, processing and modifications for value-additions of raw liquid milks for enhancing the power of the farmers and ensuring the reduction of price spread in the dairy product in developing country in Bangladesh. These views were embodied the opinions of the sagacious scholars with regard to the technological adaptation by farms for reducing the price spread in the dairy industry in Bangladesh. Towards this end, the choice of the 'technological adaptation' as an independent variable in the research is subjective. But, finally it has been found valid and empirically logical.

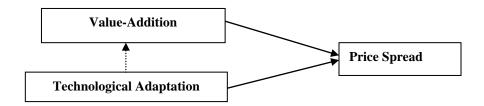


Figure 2: Research Model (Sources: Literature Review and Field Study

RESEARCH METHODOLOGY

The study is descriptive in nature. Interpretive research paradigm that relies on the qualitative method of research was adopted in this study. A qualitative research design was used for sample selection, data collection and interpretation of the data. Sixteen (16) respondents were selected by using convenient sampling technique. A semi- structured personal interview was used for the collection of data. The most popular data analysis tool for qualitative research like content analysis was adapted for the analysis of the data. According to Wilkinson (2000), this study used inductive method of content analysis for the interpretation of data. The use of the inductive method has substantiated that there has no empirical justification regarding to the research model with field study model. Finally, the

study exposed the findings and implications for the managers and policy makers as well as.

ANALYSIS AND DISCUSSION WITH IMPLICATION

Analysis of Data

Present Price Spread in the Dairy Industry in Bangladesh

Price spread is an unpleasant condition for agricultural farms particularly in the diary industry of Bangladesh. Present condition of price spread in the diary industry of Bangladesh has been delineated by the extensive reviews of empirical study and available market information. The table 2.1explored the present status of the price spread in the dairy industry of Bangladesh in different market structures.

Organized M (Cooperative S			Unorganized Market (Non cooperative Structure)						
Particular	Tk	%	Particular	Tk	%				
Farm Gate (Price)	40	63.49	Farm Gate (Price)	45	69.23				
Price Spread	23	36.51	Price Spread	20	30.77				
Market Price (MRP)	63	100.0	Market Price (MRP)	65	100				

Table -1: Present Status of Price Spread in the Dairy Industry of Bangladesh

Sources: Field Survey (2017)

The Table-1 revealed that current status of price spread in the dairy industry of Bangladesh. This table represents that the present level of price spread in different structures of dairy market in the both markets; like organized market (cooperative structure) and unorganized market (non- cooperative structure). This table enlightens that the price spread occurred 36.51% organized market and 30.77% at the unorganized market respectively. Therefore, this table summarized that price spread happened in the organized market is more than that of unorganized market.

Description of Samples

The Table-2 described the details of participants of the study. Different levels of marginal farmers of the dairy farms in Bangladesh were interviewed in the study. Sixteen (16) respondents were interviewed with different profile such as:

Participants Code	Profile	Positions	Participants Code	Profile	Positions
P1	Private	Owner	P9	Private	Owner
P2	Private	Manager	P10	Private	Manager

 Table 2: Description of the Participant in Interview

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<i>P3</i>	Private	Owner	P11	Private	Manager
P4	Private	Manager	P12	Private	Owner
P5	Private	Owner	P13	Private	Owner
P6	Private	Manager	P14	Private	Manager
P7	Private	Owner	P15	Private	Owner
P8	Private	Owner	P16	Private	Manager

Sources: Field Survey (2017)

Findings of the Study (Content Analysis)

This part of the study represents the findings based on the content analysis particularly with inductive method of the content analysis. The findings are presented in the two subsections; like firstly, findings related to the value-addition for reducing price spread in the diary industry of Bangladesh; secondly, findings related to the technological adaptation for reducing price spread in the dairy industry in Bangladesh.

Findings Related to the Value-addition and Reduction of Price Spread According to the content analysis, majority participants (n=12) stated that valueaddition can support to reduce the price spread in the agricultural product like dairy product in the developing countries like Bangladesh. Participant's opined that value-addition by farms represents the extent of farms competitive advantages in the industry. It is farm's strength over the marketing channel members, which delineates the farm's pressure for securing fair price of agricultural produces. In this regard, participant P3 explained that

"Agricultural farms like dairy farms could not store their produces due to nature of product like perishability. Besides this underlying limitation, lack of diversification of the product like value-addition is another important cause for price spread. So, value-addition may help to reduce price spread in the agricultural product like liquid milk in Bangladesh"

Furthermore, another participant P8 also justified the influence of the valueaddition in agricultural product to reduce the price spread in the agricultural industries, particularly in the dairy industry of Bangladesh. Among others, participant P11 highlighted that

"Marginal farmers are deprived of the fair price of their produces due to lack of value addition or processing of the products to the next stages or final product. This respondent also expressed that marginal farmers should concentrate on processing of the raw product or create utilities about the liquid milk for increasing the seller power to reduce the price spread. Hence, value-addition or product diversification may be the dimensions of the reduce price spread in the dairy industry in Bangladesh."

In addition, participant P12 testifies,

"I have been producing liquid milk with my private entrepreneurship. The production capacity of my farm is near about 500 kg per day, but I cannot store any milk, and process the milk to produce cheese yoghurt, Ghee etc. So, I usually sell my produces to the co-operative society. They provide me only TK35 to Tk 40 according to fat of milk. But in the final market liquid milk after processing, the price is Tk 60 to Tk 63. After year ending cooperative society provides us Tk 1 profit per liter of liquid milk that has been sold to them during the whole year. It may be noted that if we do not sell the liquid milk to the co-operative or other milk collector at their price, our liquid milk will remain unsold and finally damaged. But, if we can produce yoghurt, cheese, ghee or semi process the milk for using in the ice cream and others. Then we can earn more than the present price even after consideration of the processing and transportation cost. Thus, it can be concluded that value-addition of the liquid milk may help in reducing the price spread."

In support of the earlier participants, P16 delineated that

"At present marginal farms or farmers do not get fair price about their produces. The main cause of that is to sell the farm produces to marketing channel members at minimum price that is far different from market price. Marginal farms are not able to process or diversify the raw milk to any finished or semi-finished product for increasing the barging power with channel members or selling products to the consumers market at higher price. Hence, the marginal farms should take the initiative for processing their products at minimum level and create the utilities and sell the products to business or ultimate customers for better gains".

Findings Relating to the Technological Adaptation and Reduction of Price Spread Consistent with the content analysis, maximum participants (n=11) opined that technological adaptation is a means of value- addition and assisted to enjoy the fair price of agricultural products. They also, emphasized that the technological adaptation at the farm level increased the competitive advantages of the farms and also enhanced the bargain power of suppliers over the marketing channel members. Hence, price spread of the agro- product will be reduced at an expected level with high possibility of ensuring fair price. In this regard, participant P5 viewed that

"Technological adaptation is a decision for using technology to ameliorate the economic performance of agricultural farms. It is an important tool for value-addition and that is an individual tool for reducing the price spread in the agricultural farms in a country like Bangladesh"

In addition, P9 enlightened that

"Technological adaptation enhances the ability of dairy farms for value addition and develops the productivity to improve the economic situation of marginal farmers as well as reduce the price spread in the dairy industry of Bangladesh".

Furthermore, others participants P13 expressed the following opinion,

"Technological adaptation is a tool for extending performance of the dairy farms, where farms can explore the chances of the value-addition, product diversification as well as increase the extensive production with expected level of efficiency. Hence, it can be concluded that technological adaptation helps to reduce price spread and enjoy fair price for farms producing dairy products in Bangladesh".

In the survey, P16 explained that

"Technological adaptation by marginal dairy farms can amend their unpleasant economic condition and enhances the competence for their diversifications of the raw milk to the semi-finished and finished product. This ability removes unfair pricing of liquid milk and enhances the power of suppliers for achieving the fair price. Thus, as a result technological adaptation the price spread in the dairy industry of Bangladesh be reduced largely.

Case Study

Qualitative analysis case study is another successful method for data analysis. At the time of the field study many cases were found relevant to the study, among them, two cases substantiate the facts of the present study in details. The following boxes shown the details of the cases such as: Box-1 (Case -01)

Box -1 (Case-01)

Lal Chand (नानाज) is a graduate dairy farmer. He completed BBA and MBA (Major in Finance) degree from a renowned Private University in Bangladesh. Mr. Chand has been living in the Rashom Bari Union, at Shahzadpur Uppazila, under Sirajgonj district in Bangladesh. He is the owner of a commercial dairy farm that is situated in his local area at Sirajgonj district in Bangladesh. The operation size of Mr. Chand dairy farm is 102 cows and per day milk production is about 450 kg employing 10 workers. But, the buyer is only cooperative (milk vita) and a few propostion of milk purchase by other collectors (like Pran, Akij

and Ice creae compnay) It may be noted that siraigon district is a main hub of the liquid milk supply in Bangladesh. As a local supplier, Mr. Chand and others are higly dependent on cooperative for selling the farms' products throughout the whole season. Milk Vita is a milk processing and full cream milk powder producing company established under the Cooperative Act in Bangladesh. The management has been performed by the government authority particularly Cooperative Ministry of Peoples Republic of Bangladesh. Mr. Chand sells liquid milk to the Milk Vita regularly at a predetermined price according to fat of milk. Price of liquid milk according to fat ranges from TK 35-42 per liter milk by seasons, but milk vita sells per liter processed milk at price Tk 62. In addition, the farm will get additional Tk 01 per liter as a profit from the cooperative society. But, the operating costs of dairy farms include wages of labour, raisingprice of aninmal food, other supporting materials including vatenary medicine. As a business graduate, Mr. Chand thinks that within the existing rate of raw milk, it will be dificult to continue dairy farm business in future. So, he is looking for new business oppurtunities and new profitable customers for selling liquid milk. As regard of new oppurtunity, he found that may customers are willing to purchase the dairy prouduct in the capital city with comparatively premium price than the existing buyers price. But, to meet new customer demand, Mr. Chand should perform value-addition of the raw liquid milk like yogout, Chees and creame produce from liquid milk and supply these products to the new customers in the capital city. Unfortunately, Mr. Chand could not avail this oppurtunity of fair price of the farm produces, due to lack of technology and idea about value addition process. Hence, price spread appears to exist in the dairy industry of Bangladesh.

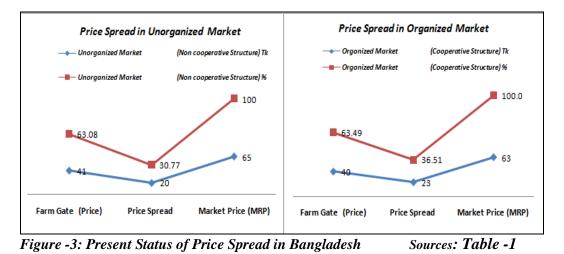
Box -2 (Case-02)

'Homeland Dairy' is a commercial dairy farm. This dairy farm has been established in the commercial city of Bangladesh. The operation size is 100 cows, per day production size is 700 kg per day and 14 workers are employed. This dairy farm sells 50 percent of total production to Sweet and Bakery and the remaining raw milk is processed and packaged in the farm and sells this product to the ultimate customers by the sales outlet daily. This farm charges Tk 56 per liter for selling to Sweet and Bakery and Tk 70 for selling to the final customer. This farm is never worried regarding to the behavior of marketing channel, because this farm is capable of selling the product to the ultimate customers by creating utilities for diary product like liquid milk. Thus, this farm has been enjoying the maximum price paid by the ultimate customers and the price spread is minimum or zero.

Discussion and Implication

Discussion

Price spread problem in the diary industry of Bangladesh has identified by the empirical researches. Those studies persuade the academia and other stakeholders for considering this issue for sustainable development of the diary industry in a developing country like Bangladesh. Through the development of infrastructural facilities and governance structure, the price spread can be reduced. But, this rate of development is not remarkable and promising for future. Present status of price spread in the dairy industry of Bangladesh has found to be positive. In the different nature of market structure like organized and unorganized market price spread in the dairy industry of Bangladesh has been found. The figure-3 delineated that in unorganized market structure (non-cooperative structure) 30.77% is the price spread in the dairy industry of Bangladesh has been found. The figure-3 structure) 36.51% the price spread in the dairy industry of Bangladesh. Hence, it has been concluded that cooperative structure does not ensure fair price for agricultural products particularly in dairy industry of Bangladesh.



The qualitative primary data expedite the understanding of value –addition and technological adaptation to reduce price spread in the dairy industry of Bangladesh. The table -3 deliberated that out of 16 participants 12 participants agreed about the rationale of value-addition to reduce price spread in the dairy industry of Bangladesh. In the extensive conversation it was found that 75% participants (marginal dairy farmers) supported the value-addition of the raw liquid milk for reducing price spread in the dairy industry of Bangladesh. The study identified that all participants except P2, P4, P7, and P15 believed that the value-addition can create comparative advantage of a farm for ensuring fair price and reducing price spread of the dairy industry in Bangladesh.

Particular	Participants										Fre q						
	1	2	з	4	J	6	7	8	9	10	11	12	13	14	15	16	1
Value addition for reduce Price Spread	У		у		у	у		у	У	у	у	у	у	у		у	12
Technical Adaptation for reduce Price Spread		У		У	У		У	У	У	У	У		у		У	у	11

 Table -3: Value-addition and Technological Adaptation to Reduce Price

 Spread

Source: Summary of Field Study

In addition, the study evaluates the importance of technological adaptation to reduce price spread in the dairy industry of Bangladesh. The result of the analysis demonstrated the significance of technological adaptation and substantiated this result with primary data that have been collected and analyzed through qualitative research tools like content analysis (inductive method).

Summary of this data analysis was exposed in the table-3, which justified the validity of the study in the context of this to research. The synopsis of the analysis highlighted the participant's admiration to the technological adaptation to reduce price spread in the dairy industry of Bangladesh. The table depicted the respondent's opinion about the contribution of the technological adaptation by the marginal dairy farms in the developing countries for reducing the price spread. The findings of survey show that, from 16 participants 11 i.e *68.75%* participants expressed their judgment in favor of positive relationship between the technological adaptation and reduced price spread in the dairy industry of Bangladesh. Only a few participants like P1, P3, P6, P12, and P14 expressed positively regarding the technological adaptation for reducing price spread, but their comments did not carry powerful content and word matching that justify their opinions in favor the objectives of the research.

Furthermore, cases presented in the analysis section for highlighting current situation of the industry and strengthening the data analysis with regard to contribution of value-addition and technological adaptation for reducing the price spread. This concentration justifies the intent of the present study to examine the

contribution of the value-addition and technological adaptation for reducing price spreading in the dairy product in a developing country like Bangladesh. Moreover, the above appreciation greatly demonstrates the empirical exploit of adapted methodology and research method to substantiate the nature of the research as well as examine the intent of the research to study.

Implications

Research implication is a mirror or glance; it is an important part of the research report. Implication expounds the involvement of the managers and other stakeholders of the respective field. For the present research, it has identified the best implications for making solutions of the identified research problem in the context to the dairy industry of Bangladesh. In respect to evidence of the intent of the study, the study addressed applicable and effortless propositions for value-addition and technological adaption in the dairy industry of Bangladesh. Finally, the study focused on the managerial consideration for application of the implications for overcoming the challenges of implementation of the research outcomes. This research implies a few reliable and appreciable measures for implementation of the research findings and minimizing the challenges. These are:

- i. Manager should examine the business opportunities for product diversifications and value-addition of the raw liquid milk. Also, should evaluate the financial projection about the fair price of the dairy products like liquid milk.
- ii. Manager should participate in appropriate training program for enhancing the awareness and development of the perception about the value- addition of dairy products.
- iii. Manager must adopt the consultancy or take advice from the expert's for adaptation of small scale technology at the farm level.
- iv. Manager ought to make projection regarding the primary investment for adaptation of small scale technology that is suitable for value addition in the dairy product.
- v. Manager is supposed to identify the unforeseen and uncertain issues that might hinder the implementation of the research outcomes and make easy to reduce price spread in the diary industry of Bangladesh.
- vi. The firm, whose size is medium and is incapable of handling the value addition and adaptation of technology, should perform this task individually. Managers of these firms should contract with such other farms and make a group for value addition and technological adaptation on a collective basis.

Furthermore, the study has other implications for government agency and stakeholders for supporting value-addition and technological adaptation for reducing price spread in diary industry of Bangladesh. These are:

- i. Government and development agencies should formulate program for building awareness regarding the benefits and prospects of value-addition as well as technological adaptation by marginal farms.
- ii. Government and development agencies must provide guidelines about the technological proficiency and availability of different scale of technology for different level of farms.
- iii. Government should formulate a policy that is supportive to valueaddition and technological adaptation in the dairy farms of Bangladesh.
- iv. Government might formulate the fiscal and monetary policy to provide financial incentive to the dairy farms for involvement in value –addition activities and technological adaption.
- v. Finally, government and stakeholders may establish governance structure for the proper use of technology and value-addition activities to reduce the price spread as an alternative way to ensure fair price of the dairy product like liquid milk.

CONCLUSION

The study has expanded wisdom on agricultural marketing and food marketing strategy in the diverse concerned issues and areas. This study contributed in several ways; firstly, the study delineates concerned issues and substantiates the empirical links between independent factors and criterion factor like the price spread in the agricultural industry of Bangladesh. In addition, the study developed a conceptual research model and justified it with regards to research objectives. Secondly, the study expedites the understanding of the conceptual model and methodological strength in the context of the present study. Furthermore, the study enhanced the theoretical consideration through qualitative analysis of primary and secondary data. The results can induce the formulation of a marketing strategy for overcoming the circumstances and hastening the economic performance of agricultural farms. Finally, the study has contributed to the inclusive understanding the important factors for reducing price spread in agricultural industry particularly in dairy industry. It has also emphasized the managerial commitment for achieving success of the research in the respective field for sustainable development of agricultural sector in the developing countries like Bangladesh.

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