

Vegetable Supply Chain: A Conceptual Study

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Abstract

The primary focus of this paper is to assess the challenges and problems of supply chain of vegetables. The paper is the beginning of the doctoral study and concentrating on the conceptual mapping of idea. For this paper the extensive literature review is the base and the concept derived from the secondary sources only. The effort is expected to give a insight of the problems and would attempt to suggest remedial measures for cost optimization and efficiency in the supply chain of vegetables from farm to consumer. The basic problem lies with supply chain. Farmers are not getting requisite realization of price commensurate to their efforts due to lack of storage facilities, poor market information and unorganized faulty supply chain. A better solution can be the Public Private Partnership for the supply chain development.

Keywords: Supply Chain, Vegetables, Farmers, Minimum Support Price, Storage, Public Private Partnership.

Introduction

India's agricultural economy is undergoing through structural changes. Indian agriculture policy aimed to improve food self sufficiency and alleviate hunger through food distribution. Aside from investing in infrastructure, the government supports agriculture through minimum support prices (MSP) for the major agricultural crops, farm input subsidies and preferential credit schemes. Under the price support policy, MSPs are set annually for basic staples to protect producers from sharp price falls, to stabilize prices and to ensure adequate food stocks for public distribution. MSPs have been below the prevailing market prices. Indian government has also deployed subsidies on farm inputs including fertilizers, electrical power and irrigation water. These subsidies have led to inefficient use of these farm inputs.

India is basically an agrarian society where sole dependence has been on agriculture since time immemorial. In the olden days, the agricultural produce was fundamentally barter by nature. Gradually the scenario changed with the changing times and agriculture produce began being sold with an element of commercial value. Trading of agriculture produce began for exchange of money and from trading to marketing of agricultural produce began. The marketing as a term is broader than traditional trading, and agricultural marketing as a concept is still evolving in the Indian agrarian society. In India, there are network of cooperatives at the local, regional, state and national levels that assist in agricultural marketing. Agricultural marketing can be defined as the commercial functions involved in transferring agricultural products consisting of farm, horticultural and other allied products from producer to consumer. Agricultural marketing also reflect another dimension from supply of produce from rural to rural and rural to urban and from rural to industrial consumers. As it is well known more the number of mediatory more will be the costs as each transaction incurs expenses and invites profits. Ultimately when it comes to the producer the cost of the produce goes up steep. In the entire process of marketing the producer gets the lowest price and the ultimate consumer pays the highest as the involvement of more middlemen in the entire distribution process. There are several complexities involved in agricultural marketing as agricultural produce involves element of risk like perish ability and it again depends on the type of produce. The pricing of the produce depends on factors like seasonality and perish ability and it depends on the demand and supply also. And all these are interwoven and ultimately make a deep impact on agricultural marketing.

Research Problem

There are several challenges involved in marketing of agricultural produce. There is limited access to the market information, literacy level among the farmers is low, multiple channels of distribution that eats away the pockets of both farmers and consumers. The government funding of farmers is still at nascent stage and most of the small farmers still depend on the local moneylenders who are leeches and charge high rate of interest. There are too many vultures that eat away the benefits that the farmers are supposed to get. Although we say that technology have improved but it has not gone to the rural levels as it is confined to urban areas alone. There are several loopholes in the present legislation and there is no organized and regulated marketing system for marketing the agricultural produce. The farmers have to face so many hardships and have to overcome several hurdles to get fair and just price for their sweat.

The critical issues that plague Indian agriculture at present are the knowledge deficit and infrastructure deficit, especially in the rural areas. Problems related to irrigation infrastructure, market infrastructure and transport infrastructure add significant cost to farmers' operations. Another issue is lack of delivery mechanisms. There are a number of schemes aimed towards developing agriculture. We do not have effective delivery mechanisms that

can translate those into effective facilitation at the ground level, in terms of increasing productivity or decreasing cost or increasing price realization. Slow agricultural growth is a concern for policymakers as some two-thirds of India's people depend on rural employment for a living. Current agricultural practices are neither economically nor environmentally sustainable and India's yields for many agricultural commodities are low. Farmer's access to markets is hampered by poor roads, rudimentary market infrastructure, and excessive regulation. Producers may have choices in terms of the niche they fill and how best to realize their comparative advantage. Agricultural economics need to reevaluate the traditional preference for a particular form of farm and market organization for agriculture.

On the basis of extensive studies done, the actual problem observed is “ *Real farmers are not getting requisite realization of price commensurate to their efforts due to lack of storage facilities, poor market information and unorganized faulty supply chain.* ”

Rationale of the Study

Vertical coordination encompasses a continuum of possibilities from open spot market transactions, where price is the only mechanism of coordination to full vertical integration, where managerial orders direct the flow of goods between stages. The transaction cost economics (TCE), agricultural markets and marketing channels are likely to increase in diversity with a number of different vertical coordination arrangements coexisting to service different market needs. Potential market efficiencies from closer vertical coordination may improve the relative competitiveness of an industry and result in an outward shift of the demand curve through the ability to tailor product quality to the needs of specific market segments. The role may include facilitation of collective bargaining processes. Looking into the future, advances in electronic communication may “buck the trend” toward closer vertical coordination among producers, processors and retailers by presenting opportunities for producers of specialty goods to deliver directly to the end-user. Electronic communication may benefit agricultural producers by increasing their access to information. A recent research carried out by Paul Artiuch and Samuel Kornstein students at the MIT Sloan School of Management reveals that Delhi, capital of India running Azadpur Mandi is turning out to be the largest wholesale produce market in all of Asia, Covering 80 acres in North Delhi. It is being chaotic, and messy, but it all seemed to work even though Azadpur mandi is significantly over capacity. The bottleneck for farmers to directly supply to the supermarket chains is the access to a distribution facility for grading, sorting and packaging of vegetables. So the objectives are:

- To characterize the different types of supply chains for vegetables.
- To redesign a supply chain for vegetables based on public private partnership concept.

Review of Literature

Efforts to develop the agricultural sector in developing countries are now taking place against the background of major structural change in the world agricultural industry. In many developed countries, agricultural production is changing from an industry dominated by family-based, small-scale farms or firms to one of larger firms that are more tightly aligned across the production and distribution value chain (Boehlje, 2000). In addition, the trend of market-orientated reforms, following multilateral trade liberalization and especially structural adjustment programmes in developing countries, has led to the increased integration of world markets (Reardon & Barrett, 2000). As per the observation of research conducted by P. K. Suri and Sushil (2006) Collaborations among companies are common in the business world but rarely observed among government organizations for agricultural development.

Reaching the end of the period of 11th five Years Plan (2007-2012), the support and available infrastructural facilities are in the process of expansion and very soon the 12th Five Years Plan (2012-2017) will come up and expecting some positive support to agriculture to work on the road map of the agricultural growth (Alam, G. and Verma, D,2007). Naresh Singla et al. (2011) says that to improve small producer's livelihoods, linking primary producers with global and national markets through fresh food retail chains is seen as one of the emerging agricultural marketing practices in India. Shawn Cole and Barrett Kirwan (2009) represent the attempt at exploring the individual, temporal, and regional determinants of participation in agricultural risk management. S.H. Baba et al. (2010) has suggested that the coverage of technology mission should be expanded to other niche areas of vegetable cultivation. Kathryn A. Onken and John C. Bernard (2010) views that with the demand in local labeling programs such as the National Buy Fresh Buy local promotion appearing in increasing numbers, consumers will be seeing many messages about local and fresh produced vegetables. The study has also highlighted the needed effective measures to reduce marketing losses at various stages. Demand for stronger vertical coordination in the food system is discussed by ROBERT J (2010) as a mean of satisfying increasingly diverse consumer preferences are changing the landscape facing food supply chain participants. Giancarlo Moschini, Luisa Menapace and Daniel Pick (2008) discusses that the economics of geographical indications (GIs) is assessed within a vertical product differentiation framework that is consistent with the competitive structure of

agriculture. Mighell and Jones (1963) explain that the term includes all the ways of harmonizing the vertical stages of production and marketing. The market-price system, vertical integration, contracting, and cooperation singly or in combination are some of the alternative means of coordination.” Within this succinct definition is the notion that vertical coordination encompasses a continuum of possibilities, from open market spot transactions at the one end, through to full vertical integration at the other and including strategic alliances, joint ventures, contracting, etc. The idea generated by Rachael E. Goodhue (2010), Contracting and other forms of vertical coordination are important parts of the supply chains for many agricultural products. Ramesh Chand has a great contribution academically to provide the solution for a varied range of problems in agriculture sector, and throws light on the future of agriculture and expectation to the industry till 2020. To improve small producer’s livelihoods Rakesh Singh and H.P Singh (2009) has developed many models. The fresh food retail chains are investing from farm to fork to buy fruits and vegetables directly from farmers and sell them to retail buyers. However, fresh food retail chains are largely found working with only large farmers and exclude small farmers for various reasons (Mangala, K.P. and Chengappa, P.G, 2008). Klaus Abbink et al. (2011) say that strategic interaction between public and private actors is increasingly recognized as an important determinant of agricultural market performance in Africa and elsewhere. Lars-Erik Gaddei (2004) concludes that the new conditions have affected the atmosphere in distribution channels encouraging more cooperative relationships. Berck and Perloff found the gap that retail chain procure only a limited proportion of the grower’s crop without any firm commitment and, more so, on a day-to-day basis. It has made no genuine provision for any agri-input or other services and does not have any formal contract arrangements with the farmers. The produce not accepted by the RC has to be disposed off by the farmers elsewhere. Michael G. Jacobides (2005), found that gains from intra firm specialization set off a process of intra organizational partitioning, which simplifies coordination along parts of the value chain. Barnett and Mahul reviewed the research on market structure and performance, vertical coordination arrangements, and institutions for producer collective action has brought a good insight about contributions to empirical modeling of agricultural price determination and marketing margins are also evaluated, as are innovations in research on spatial market relationships and the role of storage. Research conducted by Douglas E. Hughes et al. (2012) contributes that propositions linking the levers to market-based capabilities are offered to shape new research opportunities in the domain of the marketing and sales interface. The research done on bargaining power of retailers by Ganesh Iyer and J. Miguel Villas-Boas (2003) concludes that an increase in the relative power of the retailer in the channel reduces double marginalization and promotes channel coordination. Balagtas and Holt’s discussion has contributed to understand market information systems and the functioning of market-based mechanisms for agricultural risk management, including futures, options, and insurance. Though the progress over the decades have been a remarkable journey Gulati explains the demand for stronger vertical coordination in the food system as a means of satisfying increasingly diverse consumer preferences are changing the landscape facing food supply chain participants. The consolidation trend in the marketing sector seems inexorable, implying that noncompetitive behavior and its effects will remain high on the research agenda. Nicholas Roberts and Varun Grover (2012) talks that Customer agility captures the extent to which a firm is able to sense and respond quickly to customer-based opportunities for innovation and competitive action. Joseph and Soundrarajan has provided the empirical price analysis research and concluded that it will face new data challenges in an environment where fewer and fewer transactions are being conducted in open markets, but this creates research opportunities as we seek answers to how different vertical coordination forms coexist and interact with one another. Paying close attention to the time-series properties of commodity market variables will continue to be important, irrespective of whether a structural or nonstructural modeling approach is being used. Study conducted by Birthal and Joshi to know the extent of investment made in promotion of marketing infrastructure in the country and find out whether private investment induces public investment or vice versa. The study by M S Jairath and Gaurav Jairath (2009) indicates that on an average on each rupee invested by public sector, private sector invests Rs. 1.20. The analysis indicates that there is a very strong complementarity between private and public investment. The study suggests that in order to give further fillip to investment in agricultural marketing infrastructure.

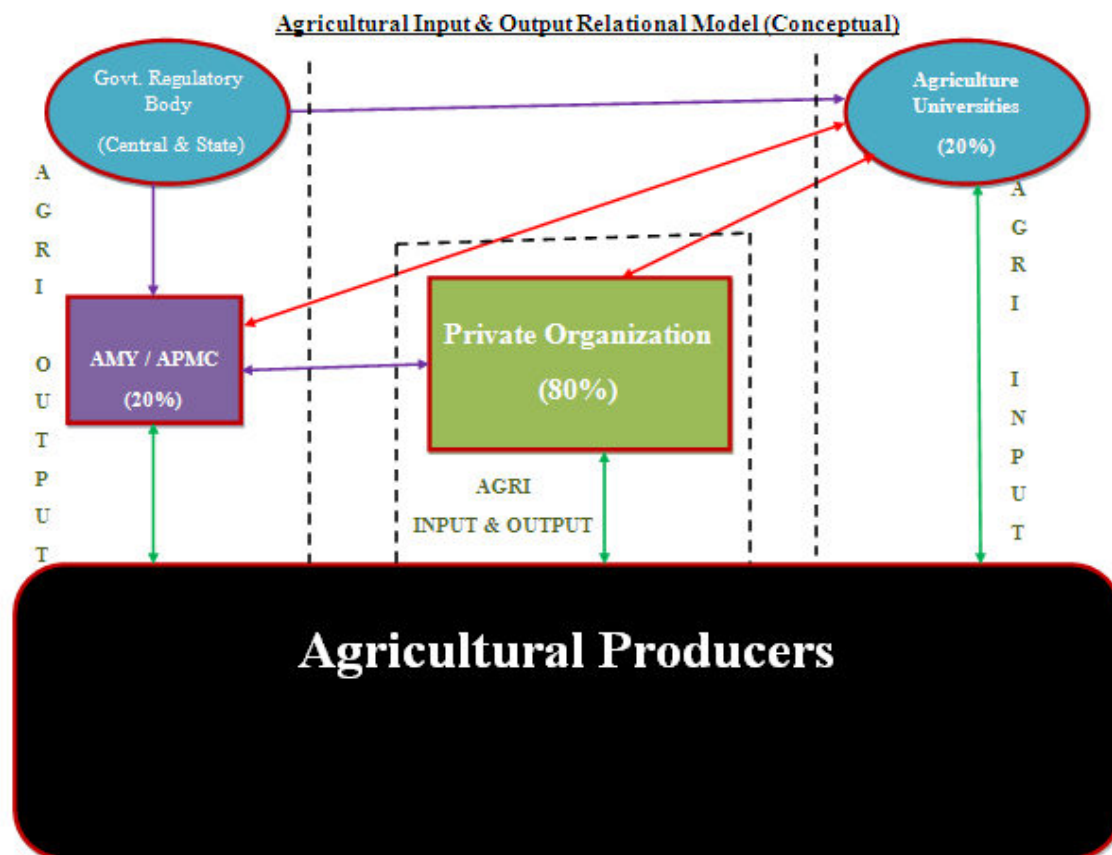
Research Design and Methods

The study is descriptive in nature and for this purpose only the secondary source of data has been used. Firstly the secondary data is getting used as literature review to understand the existing theories in India and around the globe. The purpose is getting solved by the visit of different online libraries, published articles available with different online databases and the printed published journals, magazines, news papers and books. Most of the data gathered from secondary source will get filtered and will get used in final thesis with references. The study is centered to gather the information about the status of three parties involved from production to consumption of green vegetables. So the dimensions are: (1) Input Facilities (2) Wastage (3) Production cost (4) Transaction cost (5) Price benefit (6) Motivation.

Scope of the Research

The study is aimed at the states of India (Andhra Pradesh, Bihar, Jharkhand, Odisha, West Bengal and Uttar Pradesh) as geographical boundary. Since Odisha is the state coming up with rapid development and being an educational hub and demanding more vegetables. Government is also contributing its part to develop vegetable cluster in different districts by the project of NVI (National Vegetable Initiative). Other states chosen are the lead growers of vegetables in India. This is a varied selection of states can be a good scene to study and can contribute to vegetable growers and customers. For the purpose of study Potato, Brinjal, Cabbage, Cauliflower and Okra vegetables have got selected due to the high yield, maximum utilization and value addition to the produce. The study is limited to geographical boundary of state of Odisha in this phase of research due to time factor and availability of resources. Sample selected for study is representing the population but whole population is not taken in consideration is one of the most important constraints. Most of the data collected will be qualitative in nature.

Expected Contributions



References

- (1) Abbink Klaus, Jayne Thomas S, Moller Lars C, The Relevance of a Rules-based Maize Marketing Policy: An Experimental Case Study of Zambia School of Economics, University of East Anglia, Journal of Development Studies, Vol. 47, No. 2, 207–230, February 2011.
- (2) Abel, M. E. 1962. Harmonic Analysis of Seasonal Variation with an Application to Hog Production. *Journal of the American Statistical Association* 57: 655–667.
- (3) Altemeier.K, Tabar S.R, Daris N, “Modelling Policy Option in The Indonesian Agricultural Sector”, *Applied Economics* 1991, 23, 435-446.
- (4) Ahsan, S. M., A. A. G. Ali, and N. J. Kurian. 1982. Toward a Theory of Agricultural Insurance. *American Journal of Agricultural Economics* 64: 520–529.
- (5) Alam, G. and Verma, D. (2007) *Connecting Small-Scale Farmers with Dynamic Markets: A Case Study of a Successful Supply Chain in Uttarakhand*. Centre for Sustainable Development, Dehradun.
- (6) Albion, M. S. 1983. *Advertising’s Hidden Effects: Manufacturers’ Advertising and Retail Pricing*. Boston, MA: Auburn House.

- (7) Alston, J. M., H. F. Carman, and J. A. Chalfant. 1994. Evaluating Primary Product Promotion: The Returns to Generic Advertising by a Producer Cooperative in a Small, Open Economy. Proceedings from the NEC-63 Spring '94 Conference: 145–167.
- (8) Alston, J. M., J. W. Freebairn, and J. James. 2001. Beggar-Thy-Neighbor Advertising: Theory and Application to Generic Commodity Promotion Programs. *American Journal of Agricultural Economics* 83:888–902.
- (9) Antonovitz, F., and T. Roe. 1986. A Theoretical and Empirical Approach to the Value of Information in Risky Markets. *Review of Economics and Statistics* 68: 105–114.
- (10) Aradhya, S. V., and M. T. Holt. 1990. Price Risk in Supply Equations: An Application of ARCH Time-Series Models to the U.S. Broiler Market. *Southern Economic Journal* 57: 230–242.
- (11) Ardeni, P. G. 1989. Does the Law of One Price Really Hold for Commodity Prices? *American Journal of Agricultural Economics* 71: 661–669.
- (12) Azzam, A. 2003. Market Transparency and Market Structure: The Livestock Mandatory Reporting Act of 1999. *American Journal of Agricultural Economics* 85: 387–395.
- (13) Azzam, A., and E. Pagoulatos. 1990. Testing Oligopolistic and Oligopsonistic Behavior: An Application to the U.S. Meat Packing Industry. *Journal of Agricultural Economics* 41: 362–370.
- (14) Azzam, A., and J. R. Schroeter. 1995. The Tradeoff between Oligopsony Power and Cost Efficiency in Horizontal Consolidation: An Example from Beef Packing. *American Journal of Agricultural Economics* 77:825–836.
- (15) Baba S.H, Wani M.H, Wani S.A. and Yousuf Shahid (2010), Division of Agricultural Economics and Marketing, Sher-e-Kashmir University of Agricultural Sciences and technology of Kashmir, Vol. 23 January-June 2010 pp 115-127.
- (16) Bachelier, L. 1900. *The Theory of Speculation*. Paris: Gauthier-Villars. Baillie R. T., and R. J Myers. 1991. Bivariate GARCH Estimation of the Optimal Commodity Futures Hedge. *Journal of Applied Econometrics* 6: 109–124.
- (17) Bajpai, N. and Dasgupta, N. (2004) 'Multinational companies and Foreign Direct Investment in China and India', CGSD Working Paper No. 2, The Earth Institute of Columbia University, www.earth.columbia.edu.
- (18) Balagtas, J. V., and M. T. Holt. 2009. The Commodity Terms of Trade, Unit Roots, and Nonlinear Alternatives: A Smooth Transition Approach. *American Journal of Agricultural Economics* 91: 87–105.
- (19) Barkema, A., and M. Drabenstott. 1995. The Many Paths of Vertical Coordination: Structural Impacts for the Food System. *Agribusiness* 11: 483–492.
- (20) Barnett, B. J., and O. Mahul. 2007. Weather Index Insurance for Agriculture and Rural Areas in Lower-Income Countries. *American Journal of Agricultural Economics* 89: 1241–1247.
- (21) Barrett, C. B., and J. R. Li. 2002. Distinguishing between Equilibrium and Integration in Spatial Price Analysis. *American Journal of Agricultural Economics* 84: 292–307.
- (22) Bean, L. H. 1929. The Farmers' Response to Price. *Journal of Farm Economics* 11: 368–385.
- (23) Berck, P., and J. M. Perloff. 1985. A Dynamic Analysis of Marketing Orders, Voting, and Welfare. *American Journal of Agricultural Economics* 67: 487–496.
- (24) Bessler, D. A., and S. W. Fuller. 1992. Co integration between U.S. Wheat Markets. *Journal of Regional Science* 33: 481–501.
- (25) Bhatnagar, S, 2004, E-government – From Vision to Implementation: A Practical Guide Implementation, New Delhi: Sage Publications, pp 110-117.
- (26) Bockstael, N. E. 1984. The Welfare Implications of Minimum Quality Standards. *American Journal of Agricultural Economics* 66: 466–471.
- (27) Birtal, P.S., Joshi, P.K. and Gulati, A. (2005) *Vertical Co-Ordination in High-value Food Commodities: Implications for Smallholders*. MTID Discussion Paper No. 85, International Food Policy Research Institute, Washington.
- (28) Cole Shawn and Kirwan Barrett (2009), Amer. J. Agr. Econ. 91 (Number 5, 2009): 1243–1249, Agricultural and Applied Economics Association.
- (29) Chand Ramesh, "SAARC Agricultural Vision 2020", Agricultural Economics Research Review, Vol. 23 July-December 2010 pp 197-208.
- (30) Gaddei Lars-Erik, Activity Coordination and Resource Combining in Distribution Networks – implications for Relationship Involvement and the Relationship Atmosphere, *Journal of Marketing Management*, 2004, 20,157-184.
- (31) Goodhue Rachael E., Mohapatra Sandeep and Rausser Gordon C (2010), Interactions Between Incentive Instruments: Contracts And Quality In Processing Tomatoes, *Amer. J. Agr. Econ.* 92(5): 1283–1293.

- (32) Gulati, A. (2007), Organised food retail must be competitive and inclusive,' The Economic Times, 28 September.
- (33) Hughes Douglas E., Bon Joël Le and Malshe Avinash, The Marketing–Sales Interface at the Interface: Creating Market-Based Capabilities Through Organizational Synergy, *Journal of Personal Selling & Sales Management*, vol. XXXII, no. 1 (winter 2012), pp. 57–72.
- (34) Iyer Ganesh and Villas-Boas J. Miguel, A Bargaining Theory of Distribution Channels, *Journal of Marketing Research* Vol. XL, February 2003.
- (35) Jacobides Michael G, Industry Change Through Vertical Disintegration: How And Why Markets Emerged In Mortgage Banking, *Academy of Management Journal* 2005, Vol. 48, No. 3, 465–498.
- (36) Jairath M S and Jairath Gaurav (2009), Patterns of Private and Public Sector Investment in Agricultural Marketing Infrastructure in India.
- (37) *J. Agr. Econ.* Alston, J. M., R. J. Sexton, and M. Zhang. 1997. The Effects of Imperfect Competition on the Size and Distribution of Research Benefits. *American Journal of Agricultural Economics* 79:1252–1265.
- (38) Joseph, M., Soundrarajan, N., Gupta, M. and Sahu, S. (2008) *Impact of Organised Retailing on the Unorganised Sector*, Indian Council for Research on International Economic Relations, New Delhi.
- (39) Kalhan, A. (2007) Impact of malls on small shops and hawkers. *Economic and Political weekly*, 42(22): 2063-2066. Mangala, K.P. and Chengappa, P.G. (2008) A novel agribusiness model for backward linkages with farmers: A case of food retail chain. *Agricultural Economics Research Review*, (Conference Number): 363-370.
- (40) Kathryn A. Onken and John C. Bernard (2010), CATCHING THE "LOCAL" BUG: A LOOK AT STATE AGRICULTURAL MARKETING PROGRAMS.
- (41) Mittal, Surabhi and Tripathi, Gaurav (2009) Role of mobile phone technology in improving small farm productivity, *Agricultural Economics Research Review*, 22 (Conference number): 451-60.
- (42) Moschini Giancarlo, Menapace Luisa and Pick Daniel (2008), GEOGRAPHICAL INDICATIONS AND THE COMPETITIVE PROVISION OF QUALITY IN AGRICULTURAL MARKETS American Agricultural Economics Association.
- (43) Paroda, R.S. and Kumar, Praduman (2000) Food production and demand in South Asia, *Agricultural Economics Research Review*, 13(1): 1-24.
- (44) Robert J. Myers, Richard J. Sexton, and William G. Tomek (2010), A CENTURY OF RESEARCH ON AGRICULTURAL MARKETS, *Amer. J. Agr. Econ.* 92(2): 376–402; doi: 10.1093/ajae/aaq014, Oxford University Press on behalf of the Agricultural and Applied Economics.
- (45) Roberts Nicholas and Grover Varun, Leveraging Information Technology Infrastructure to Facilitate a Firm's Customer Agility and Competitive Activity: An Empirical Investigation, *Journal of Management Information Systems* / Spring 2012, Vol. 28, No. 4, pp. 231–269.
- (46) Singh Rakesh, Singh H.P, Badal P.S, Singh O.P, Kushwaha S, Sen C., "PROBLEMS AND PROSPECTS OF FOOD-RETAILING IN THE STATE OF UTTAR PRADESH (INDIA)", *Journal of Services Research*, Volume 8, Number 2 (October 2008-March 2009).
- (47) Suri P K, Sushil "E-Governance through Strategic Alliances — A Case of Agricultural Marketing Information system in India", *IIMB Management Review*, December 2006.

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