Antecedent of Dairy Supply Chain Management Practices:A Conceptual Framework

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Abstract

Objective/Purpose: The research paper attempts to understand the prevailing models of Dairy Supply Chain Management (DSCM) practices and develop a conceptual framework of DSCM with the identification of various constructs of Dairy Supply Chain Management (DSCM) through extensive literature review.

Design/Methodology: The paper draws its insights and conclusions from a review of the literature in the field of dairy supply chain management (DSCM), followed by an interaction research approach which helped to refine and validate the theory-derived framework from the perspective of practitioners.

Findings: A conceptual model is being proposed under the research study. The model is basically based on understanding developed through extensive literature review. The model illustrates the antecedents of dairy supply chain management practices and marketing orientation as independent variables and organisational performance and customer satisfaction as dependent variable.

Originality/Value: This review identifies various conceptual and research methodological characteristics of DSCM. This paper carried out a review of literature in the field of dairy supply chains management in order to understand the current practices, identify gaps and suggest future research agenda.

Keywords: Dairy Supply Chain Management Practices, Marketing Orientation, Customer Satisfaction, Organisational Performance.

1. Introduction

1.1. Indian Dairy Scenario

Dairying in India has come a long way. From being written off as a basket case a few decades back, India has emerged today as the largest milk producer in the world with an annual production of 130 million tones (2012). More than 70 percent of our milk producers are small marginal farmers, the animal are low yielding, non-descript ones, and land holding are small. The future of India dairy industry can only bebuilt on quality and quality alone. The Indian dairy industry must have the latest modern technology for milk processing and product manufacturer. One must define the standards necessary to achieve and maintain world class quality. Indian dairying must address itself to issues of productivity, efficiency and response to consumer demands. Side by side, it must upgrade and diversify the product mix into value added products to meet the challenges. So long the industry has been driven by supply but in future it should be driven by demand as disposable income rises. The white revolution created opportunities for the dairy farmers to improve employment and quality of life. The future of Indian dairy industry would also to a large extent depends on our ability to source new markets.one have the advantage of producing low cost milk and therefore the challenge is to lower processing and marketing costs without compromising on quality. Indian dairy industry need to improve product quality to compete with the best in the world.

1.2. Supply Chain Management and Indian Dairy Industry

The dairy industry in India has been on a steady path of progression since Indian independence. It has grown from producing 17 million tonnes of milk in 1951 to producing 127.3 million tonnes in 2012. Today, India is one of the largest milk producing countries in the world. This solid progress is primarily attributable to structural

changes in the Indian dairy industry brought about by the advent of dairy cooperatives. The Indian dairy industry reported a market size of USD 48.5 billion in FY2011. With a Compound Annual Growth Rate (CAGR) of 16 percent, it is anticipated to reach USD 118 billion in 2017. On the back of a rise in disposable income, coupled with strong demand for dairy products, the Indian dairy industry is all set to experience high growth rates in the next five years. The consumption pattern of dairy products in India is quite unique as compared to some of the western countries. Consumption is primarily skewed towards traditional products; however, westernized products are gradually gaining momentum in the urban areas. Interestingly, buffalo milk accounts for the largest share of the total milk produced in the country. Since the pricing of milk is based on the fat content, buffalo milk offers higher profit margins as compared to cow milk as it contains higher fat. The Indian dairy sector is characterized by high fragmentation. It is dominated by the unorganized sector comprising of 70 million rural households. The per capita availability of milk in India stands at 289.4 grams per day. Backed by strong domestic demand, the per capita availability of milk is anticipated to reach 336 grams per day in FY 2017. Currently, the Indian dairy market is growing at an annual rate of 7 per cent. Despite the increase in production, a demand supply gap has become imminent in the dairy industry due to the changing consumption habits, dynamic demographic patterns, and the rapid urbanization of rural India. This means that there is an urgent need for the growth rate of the dairy sector to match the rapidly growing Indian economy. Despite being the one of the largest milk producing countries in the world, India accounts for a negligible share in the worldwide dairy trade. The ever increasing rise in domestic demand for dairy products and a large demand-supply gap could lead India to be a net importer of dairy products in the near future.

2. Research Problem

Indian dairy industry comes a long way over the years from a milk production of 55.7 MT in 1991-92 to 127.3 MT in 2011-12. So, in order to retain and sustain in highly competitive business environment of global dairy industry, companies are now trying to improve their organisational performance and achieve competitive advantage efficiently and effectively. The entire competition in diary industry revolves around two prominent factors i.e., quality and availability. Quality and availability of dairy products become crucial due to the high degree of perishability related with the products, which require all together a different kind of supply chain commonly known as Cold Chain. So the research problem of proposed research is basically revolved around the supply chain practices of the dairy industry in terms of findings the actual happenings and accordingly analyzing the mechanism for betterment in those processes so as to create a win-win situation for all the stakeholders of dairy supply chain.

2.1. Research Question

How to manage and strategize the supply chain management practices in a way that the Indian dairy industry improves its performance and achieves competitive advantage?

3. Critical Review of Literature on Dairy Supply Chain Management

A supply chain consists of all parties involved directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers but also transporters, warehouses, retailers, and the customers. The objective of the supply chain is to maximize the overall value generated. Some of the prominent research studies are highlighted in this research paper. The various research papers are further classified as per their focus area.Table 1 presents the summarized findings of different researchers pertaining to DSCM.

On the basis of above crux of literature,Table 2 show the numbers of constructs/variables which are identified by the researcher pertaining to dairy supply chain management practices, marketing orientation, organisation performance and customer satisfaction.

4. A Conceptual Framework of DSCM

A theoretical model is being proposed in this conceptual paper which as shown in Fig. 1. The model is basically based on understanding developed by extensive literature review. The model illustrates the antecedents of dairy supply chain management practices and marketing orientation as independent variables and organisational performance and customer satisfaction as dependent variable.

4.1. Antecedents of Dairy Supply Chain Management Practices

Dairy supply chain management practices in the research model serve as an independent variable to organisational performance and customer satisfaction. The seven

Table 1: Crux of Literature related to Dairy Supply Chain Management

Authors	*Study Title*	*Key Terms*	*Methodology Applied*	*Key findings*
Fatehpuria (2013)	Indian cold supply chain: A case study	Warehousing Management (Cold Storage)	Basically two approaches were adopted to deliver into the issues and challenges faced by the industry. In the first phase of the research the cold supply chain was studied in Indian context with focus attention on one of the largest chilly producer in Guntur, A.P., and second part constituted studying the cold supply chain of basking Robbins which is a global ice-cream parlor to which cold supply chain is very much essential. The study was done in shilling by interviewing the mangers of basking Robbins in Shillong outlet.	The cold chain process is a special kind of logistics that handles the goods for both transportation and storage. The importance and necessity of the cold chain in agro sector such as fruits and vegetable, dairy industry etc. is very important or crucial and which shortage in the country damaging the perishable food items to the large extent.
Saarijarvi et al. (2013)	Extending customer relationship management : from empowering firms to empowering customers	Customer Relationship Management (CRM)	The paper reviews CRM literature published 2003-2011. Based on the literature review, it introduces a conceptual framework of the changing role of customer data in the CRM framework.	Literature has not adequately addressed the role of the emerging service orientation, value co-creation and the opportunities provided by new technology and communication channels. Drawing on a thorough CRM literature review, researchers argue that a fundamental change in CRM thinking is needed to shift the focus of CRM from empowering firms to empowering customers.
Hazen and Byrd (2012)	Toward creating competitive advantage with logistics information technology.	Information and Communication Technology (ICT)	Regression	The study defines the important role and relationship between logistics information technology (LIT) adoption and performance measures in terms of efficiency, effectiveness and resiliency. The study found that the implementation of LIT innovation generally produces positive performance outcomes for the adopting organisation.
Asabere et al. (2012)	A Review of the Roles and Importance of Information and Communication Technologies (ICTs) in Supply Chain Management (SCM) of Organisations and Companies	Information and Communication Technology (ICT)	ConceptualPaper	This research paper revealed the importance of information and communication technology (ICTs) in SCM and given various factors such as purchasing, e-procurement, operation, customer relationship, vendor management, transport and logistics are all can be improved through the effective use of information and communication technology (ICTs) in SCM.
Aung et al. (2012)	Quality Monitoring and Dynamic Pricing in Cold Chain Management	Warehousing Management (Cold Storage)	Conceptual Paper	The key findings exposed that the cold chain monitoring system play a significant role in focusing on assessment of quality and dynamic pricing information about the perishable food items.
Qrunfleh et al. (2012)	Examining alignment between supplier management practices and information systems strategy	Supplier Relationship Practices	Factor analysis, structural equation modeling (SEM) analysis using SMART Partial Least Square (PLS) software	The study finds that lean (agile) supplier management practices are positively associated with supply chain integration (flexibility). Further, alignment of lean supplier practices and IS for Efficiency enhances supply chain integration, as assessed by a positive moderating effect of IS for Efficiency on the relationship between lean supplier practices and supply chain integration.

Authors	*Study Title*	*Key Terms*	*Methodology Applied*	*Key findings*
Singh et al. (2012)	The use of carbon dioxide in the processing and packaging of milk and dairy products	Supply Chain Manufacturing Practices	Conceptual Paper	The key finding revealed the important role of modified atmosphere packing (MAP) which is being used with high carbon dioxide (CO2) concentration as well as CO2/N2 gas mixes. Researcher also find that Modified atmosphere packaging or 'gas flushing' has become a popular technique which is used to extend the shelf life (both quality and safety) of a number of dairy products.
Wang and Feng (2012)	Customer relationship management capabilities Measurement, antecedents and consequences	Customer Relationship Management (CRM)	Structural Equation Modeling (SEM)	A three-factor (customer interaction management capability, customer relationship upgrading capability and customer win-back capability) measurement model of CRM capabilities is developed and tested. Furthermore, results support the hypothesized influences of customer orientation, customer-centric organisational system and CRM technology on CRM capabilities, as well as the influence of CRM capabilities on organisational performance.
Gilaninia et al. (2012)	Evaluation and prioritization of effective factors on supply chain performance (case study: food industries of guilan province)	Organisational Performance	Multiple Regression Analysis	Researcher has done a useful survey which revealed that supply chain performance is affected by many factors which are supplier relationship, response time, and cost, process of the supply chain, flexibility and customer satisfaction as one of the twenty first century paradigm of manufacturing which help in improving the organisational competitiveness.
Muhammad et al (2012)	The Impact of Supply Chain Management Practices on the Overall Performance of the Organisation	Organisational Performance	Regression	The key finding reveals various important dimensions which are associated with SCM methods as well as explains the connection amongst SCM methods, aggressive benefit, as well as organisational overall performance.
Eris et al. (2012)	The Effect of Market Orientation , Learning Orientation and Innovativeness on Firm Performance : A Research from Turkish Logistics Sector	Marketing orientation	Structural equation modeling (SEM)	It is concluded from the study that values such as market orientation – learning orientation and innovation are important in terms of increasing the performance of service providers operating in the logistics sector in Turkey, and that such three variables have a compound impact on increasing performances of logistics service providers
Gyan Prakash (2011)	Poor's Supply Chain: Indian Public Distribution System Revisited	Basic Dairy Supply Chain Management	The methodology adopted is a mix of literature review, document analysis such as government gazettes, interview with policy makers in government, officials of agency responsible for public distribution system.	Indian agro industry is fraught with many difficulties such as inefficiency, deterioration of perishable food items, unsatisfactory quality of commodities, mismatch of demand and supply, long waiting times, poor service delivery.

Authors	*Study Title*	*Key Terms*	*Methodology Applied*	*Key findings*
Boniface (2011)	Producer relationships segmentation in Malaysia's milk supply chains	Supplier Relationship Practices	The study examines variation in relationship quality (trust, satisfaction, and commitment), loyalty and price satisfaction dimensions, using data from a survey of 133 dairy producers.	The study highlight different ways which milk buyers can develop and promote more appropriate and efficient marketing strategies with milk producers. The study has shown some implications for both policy and management in the milk industry in Malaysia. The main managerial implication is that buyers who want to promote sustainable and uninterrupted milk supplies should focus on different strategies for the different groups.
Matapurkar and Sinha (2011)	Cold chain: finally warming up to India	Transportation Management	Article Paper- Infrastructure Today	The study also focuses on how the refrigerated transportation of milk and milk products is important in maintaining the quality and freshness of the agricultural products which involves refrigerated trucks, containers, ship, trains for the transportation of perishable products.
Lu et al. (2011)	Customer satisfaction towards retailers (ICA, ICA NARA and COOP FORUM)	Customer Satisfaction	Survey technique	This research paper tries to investigate the satisfaction levels of customers in supermarkets. The study further examined the importance of overall dimensions and specific elements of customer satisfaction i.e. location, product quality, reliability, personal services, value for money etc. towards the measurement of satisfaction levels.
Karthikeyan and Teshome (2010)	Dairy supply chain management: A case of Ada'a Dairy Cooperative in Ethiopia.	Basic Dairy Supply Chain Management	Multiple Linear Regression	Multiple regression analysis indicates that out of seventeen variables taken, distance/proximity, transport services, quality of milk, distribution channel system, information system, milk collection centers, volume of milk production, management commitment, warehousing were found most important factors in enhancing the dairy supply chain effectively.
Garcia and Lunadei (2010)	Monitoring Cold Chain Logistics by means of RFID	Transportation Management	Researcher studied the literature based on role of RFID in cold chain, its advantage and synthesized the findings to develop a preliminary conceptual model.	Logistics service provider need to adopt more efficient logistics technologies i.e. RFID, Quality oriented tracking and tracing Systems (QTT), Safety monitoring and Assurance system (SMAS), FIFO (First In, First Out), FEFO (First Expire, First Out), to provide better supply chain services for their customers.
Cho (2010)	Assessing customer satisfaction and acceptance on perishable goods in the "Telepresent" environment	Customer Satisfaction	Regression , ANOVA, ANCOVA	Researcher in his study has examine various factors that affect customer satisfaction and willingness to purchase perishable goods in the online environment and how experiences with sensory goods (besides perishable goods) from online and other interactive home shopping channels affect satisfaction and willingness to purchase perishable goods.

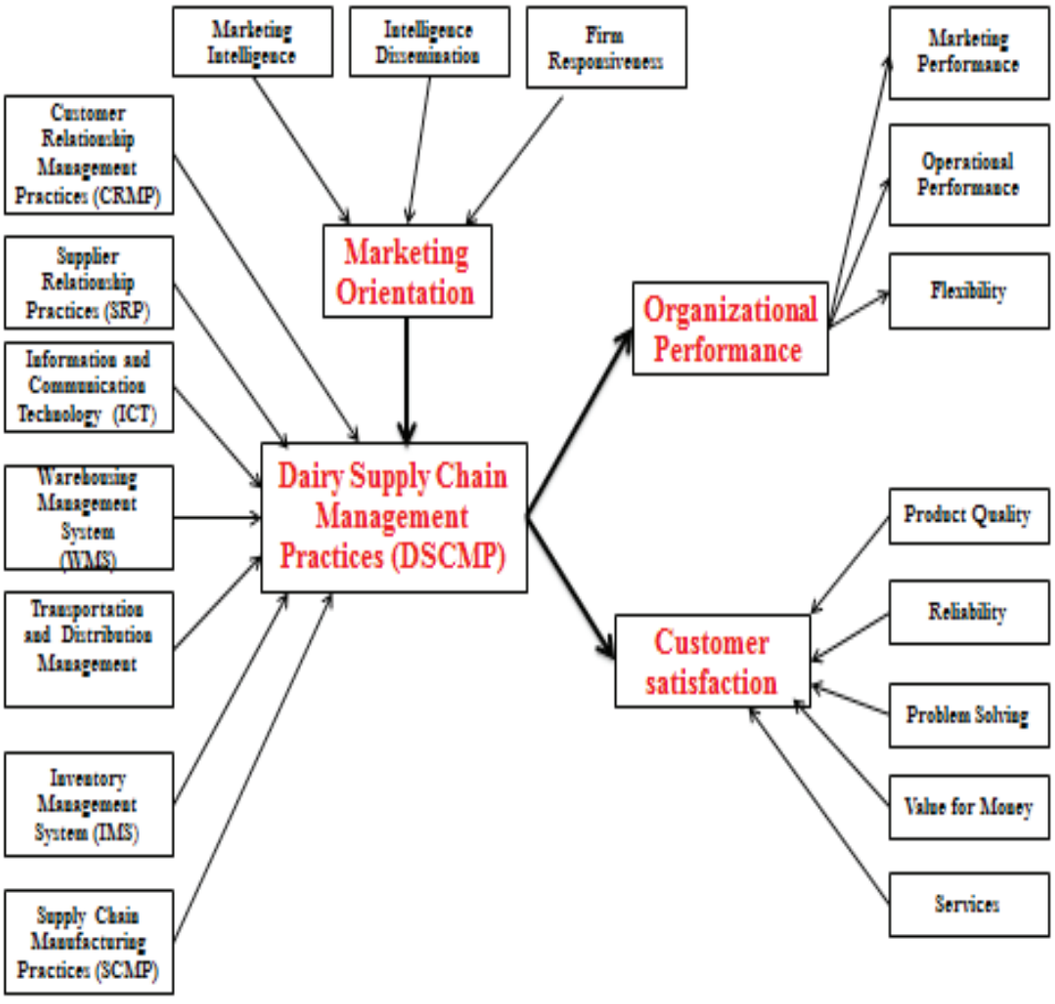
Authors	*Study Title*	*Key Terms*	*Methodology Applied*	*Key findings*
Subbaiah et al. (2009)	Supply Chain Management in a Dairy Industry – A Case Study	Basic Dairy Supply Chain Management	Case Study	This paper revealed that how supply chain management is very important for the dairy industry which involves or comprises five main activities vizPurchase of materials from suppliers, transportation of materials from suppliers to facilities, production of goods at facilities, transportation of goods from facilitates to ware houses and transportation of goods from ware houses to customers.
Min et al. (2007)	A market orientation in supply chain management	Marketing orientation	Structural equation modeling (SEM)	The study revealed how marketing orientation plays a significant role in improving the firm performance and also exposed that MO is still a foundation for managing the supply chain. MO has a positive impact on firm performance (when SCO is controlled) and, thus, implementing MO is not the responsibility of marketing alone and this study suggest that everyone in the firm should promote MO and SCO inside the firm to create effective SCM across the supply chain.
National Bureau of Agricultural Commodity and Food Standards (2005)	Good manufacturing practices for milk collection center	Supply Chain Manufacturing Practices	Agricultural Standards Committee Report (2005)	This report revealed the various important guidelines for the good manufacturing practices for milk collection center which are milk collection center management, management of machines and equipment and tools for raw milk receiving, raw milk cooling system management, storage tank management, cleaning-in-place (CIP), maintenance of machines and equipment, utility management which involves electricity, water supply etc., management of transportation and transport vehicles which involves transportation, raw milk transport vehicle etc., management of raw milk purchasing system, personnel management, safety measures and environment management and management of raw milk quality control.
Smith et al. (1995)	Good manufacturing practices for dairy processing plant	Supply Chain Manufacturing Practices	Dairy Practice Council Report (1995)	This report revealed that how various good manufacturing practices i.e. Personal Practices, Sanitary operation and production, Buildings and facilities, Warehousing areas practices, Equipment and utensil design practices play a significant role in improving and enhancing the quality and freshness of dairy products.

Table 2: Research Construct Identified by the Researcher

Research Construct	Variables	Researchers
Dairy Supply Chain Management Practices	Information and Communication Technology (ICT)	Hazen and Bird (2012), Asabere *et al*. (2012), Mandlik *et al.* (2012), Mohammadi *et al.* (2011), Biniazi *et al*. (2011), Okeyere and Mekonnen (2010), Shavazi *et al*. (2009), Sridhar (2010), Fasanghari *et al*. (2008), Ababa (2008), Mitsugi *et al*. (2007), Lonngren and Kolbe (2010), Blankley (2008), Li *et al*. (2009), Sezen (2008), Technopak (2010), Donk (2008), Lin and Tseng (2006), Quesada *et al*. (2012), Barve (2011),) Jie *et al*. (2007).
	Supply Chain Manufacturing Practices (SCMP)	Singh *et al*. (2012), Chandan (2007), Narang (2007), Punjrath (2007) Goyal and Alam (2007), NBACFS (2005), Smith (1995), Baramichai *et al*. (2007), Upasani *et al*. (2011), Costa and Lima (2009), Karlsson and Scold (2007), Scala *et al*. (2006), Ayag *et al*. (2012).
	Warehousing Management System (WMS)	Fatehpuria (2013), Aung *et al*. (2012), Ramaa *et al*. (2012), Hilmola and Lorentz (2011), Joshi *et al*. (2009), Min (2009), William and Tokar (2008), Karthikeyan and Teshome (2010), Xiaohong *et al*. (2010), Sridhar (2010); Giulia and Franceso (2010), Baker (2007), Ruben (2006), Jorndan Ina (2005).
	Transportation and Distribution Management (TDM)	Matapurkar and Sinha (2011), Garcia and Lunadei (2010), Chan and Zhang (2011), Karthikeyan and Teshome (2010), Giulia and Franceso (2010), Rangasamy and Dhaka (2008), Burki and Khan (2008), Sharma *et al*. (2007), Butler *et al*. (2005), Stefansson and Lumsden (2009), Tokar (2010), Ballou (2007).
	Inventory Management System (IMS)	Juan *et al*. (2012), Blankley (2008), Garcia and Lunadei (2010), Baker (2007), William and Tokar (2008), Ayag *et al*. (2012), Hofman (2009), Stacey *et al.* (2007).
	Supplier Relationship Practices (SRP)	Qrunfleh *et al*. (2012), Boniface *et al*. (2011), Hong *et al*. (2010), Shook *et al*. (2009), Leeuw and Franco (2009), Eltantawy *et al*. (2009), Ebebe *et al*. (2009), Quesada *et al*. (2008), Khan *et al*. (2008), Cox *et al*. (2007), Spiller *et al*. (2006), Clegg *et al*. (2006), Hamprecht *et al*. (2005), Baramichai *et al*. (2007), Storey *et al*. (2006), Gilaninia *et al*. (2012), Karthikeyan and Teshome (2010), Fierro and Redondo (2008), Barve (2011), Jie *et al*. (2007), Mohammed *et al*. (2012).
	Customer Relationship Management (CRM)	Saarijarvi *et al*. (2013), Wang and Feng (2012), Battor *et al*. (2010), Feng *et al*. (2010), Lin *et al*. (2009), Singh and Power (2009), Jeong and Hong (2007), Zokai and Hines (2007), Payne and Frow (2005), Lin *et al*. (2010),Spiller *et al*. (2006), Prasad *et al*. (2011),) Jie *et al*. (2007), Mohammed *et al*. (2012).
MARKETING ORIENTATION	Marketing Intelligence	Slater and Narver (2000), Martino *et al*. (2001), Kumar *et al*. (1998), Malik *et al*. (2008), Ofoegbu *et al*. (2012), Jaworski *et al*. (1993), Tukamuhabwa *et al*. (2011), Min *et al*. (2007), Lada (2009), Johnson *et al*. (2009), Eris *et al*. (2012), Gudlaugsson *et al*. (2009), Lings *et al*. (2009), Dwairi *et al*. (2012), Green *et al*. (2006), Avlenitis *et al*. (1995).
	Intelligence Dissemination	Negulescu (2010), Martino *et al*. (2001), Kumar *et al*. (1998), Malik *et al*. (2008), Ofoegbu *et al*. (2012), Jaworski *et al*. (1993), Tukamuhabwa *et al*. (2011), Min *et al*. (2007), Lada (2009), Johnson *et al*. (2009), Eris *et al*. (2012), Gudlaugsson *et al*. (2009), Lings *et al*. (2009), Dwairi *et al*. (2012), Green *et al*. (2006), Avlenitis *et al*. (1995).
	Responsiveness	Voola *et al*. (2010), Kanagasabai (2008), Martino *et al*. (2001), Kumar *et al*. (1998), Malik *et al*. (2008), Ofoegbu *et al*. (2012), Jaworski *et al*. (1993), Tukamuhabwa *et al*. (2011), Min *et al*. (2007), Lada (2009), Eris *et al*. (2012), Gudlaugsson *et al*. (2009), Lings *et al*. (2009), Dwairi *et al*. (2012), Green *et al*. (2006), Jie *et al*. (2007), Avlenitis *et al*. (1995).
ORGANISATIONAL PERFORMANCE	Marketing performance	Prasad *et al*. (2011), Juttner *et al*. (2010), Li *et al*. (2006), Ou *et al*. (2010), Gharakhani *et al*. (2011), Muhammadi *et al*. (2012), Pires *et al*. (2010), Babbar *et al.* (2008), Mor and Sharma (2012), Gilaninia *et al*. (2012), Bigllardi and Bottani (2010), Grawe *et al*. (2009), Battor *et al*. (2010), Kim *et al*. (2006), Green *et al*. (2008), Mohammed *et al*. (2012).
	Operational performance	Mohammed *et al*. (2012), Li *et al*. (2006), Prasad *et al*. (2011), Kurien *et al*. (2011), Pires *et al*. (2010), Aramyan *et al*. (2007), Vrontis *et al*. (2006), Ou *et al*. (2010), Taylor *et al*. (2006), Power (2010), Halley and Beaulieu (2009), Green *et al*. (2008), Kim *et al*. (2006), Green *et al*. (2008).
	Flexibility	Kumar *et al*. (2006), Deshpande (2012), Mcdowell (2013), Taylor (2003), Singh *et al*. (2011), Lazarevic *et al*. (2007), Agus (2011), Gilaninia *et al*. (2012),Barve (2011),Aramyan *et al*. (2007), Damghani *et al*. (2011), Bigllardi and Bottani (2010), Kim *et al*. (2010), Feng *et al*. (2010), Kristal *et al*. (2010), Jie *et al*. (2007)

CUSTOMER SATISFACTION	Product Quality	Garvin (1987), Yuen and Chan (2010), Dhar *et al*. (2001), Dellaert *et al*. (1998), Radhika *et al*. (2011), Spiegel (2004), Jakpar *et al*. (2012), Khan *et al*. (2012), Gomez *et al*. (2003), Chimboza and Motandwa (2007), Tsiotsou (2006), Butt (2011), Andaleeb (2006), Cho (2010), Abdullah *et al*. (2010), Lu *et al*. (2011).
	Reliability	Jayakumar *et al*. (2012), Naik *et al*. (2010), Ragavan *et al*. (2013), Yuen and Chan (2010), Spiegel (2004), Jakpar *et al*. (2012), Eckert *et al*. (2012), Boniface *et al*. (2010), Butt (2011), Andaleeb (2006), Cho (2010), Abdullah *et al*. (2010), Lu *et al*. (2011).
	Value for money	Ciavolino and Dahlgaard (2007), Cronin and Taylor (1992), Zeirhaml (1988), Keaveny (1995), Varki and Colagate (2001), Sirohi *et al*. (1998), Hauser and Urban (1986), Wood Ruff(1997), Slatter (1997), Eckert (2007), Gomez (2003), Khan *et al*. (2012), Jahashahi *et al*. (2011), Boniface *et al*. (2010), Chimboza and Motandwa (2007), Tsiotsou (2006), Butt (2011), Cho (2010), Abdullah *et al*. (2010), Lu *et al*. (2011).
	Problem Solving	Jayakumar *et al*. (2012), Naik *et al*. (2010), Homburg *et al*. (2001), Eckert (2007), Radhika *et al*. (2011), Boniface *et al*. (2010), Chimboza and Motandwa (2007), Lu *et al*. (2011).
	Services	Jakpar *et al*. (2012), Khan *et al*. (2012), Gomez (2003), Eckert (2007), Jahsnshahi *et al*. (2011), Boniface *et al*. (2010), Chimboza and Motandwa (2007), Butt (2011), Andaleeb (2006), Cho (2010), Abdullah *et al*. (2010), Lu *et al*. (2011).

Fig. 1: Proposed Theoretical Research Model



important antecedents of dairy supply chain management practices identified through literature are defined below:

4.1.1. Information and Communication Technology (ICT) Tools and Techniques

ICT is playing a significant role in improving the services of dairy sector. ICT has enabled services for better use in quality, transport, production, marketing, and services. It also facilitates the integration of locally generated revenue manpower, resources, and facilities into human empowerment grid. Various literatures also suggest that ICT are acting as integrating and enabling technologies for the economy and they have profound impact on dairy society. ICT implementation in dairy industry will deliver advanced, reliable, fastsupply of milk, and milk products to their respective customers. ICT tools and technique like RFID help the dairy industry in automatically recording the logistics operation in the food supply chain. ICT is also playing an essential role in facilitating the implementation of policy and in measuring its effectiveness. The ICT is delivering various tools that are fundamentally needed to collect process and manage the data, and present it in a standardized format.

4.1.2. Warehouse Management System (WMS)

In a dairy supply chain, warehousing function is very critical due to the perishable nature of milk and milk products. India's agricultural infrastructure, and in particular its fledgling cold chain industry, may have caught investor attention, particularly after news of farm produce rotting because of lack of suitable storage infrastructure. Cold chain in dairy sector serves most important utility in terms of preservation of quality because of its perishability. Cold chain is providing a temperature-controlled supply chain network, with storage and distribution activities carried out in a manner such that the temperature of a product is maintained in a specified range, needed to keep milk and milk products fresh and edible for a much longer period than in normal ambient conditions. The system facilitates long-distance transport of various products as well as makes seasonal products available over the entire year.

4.1.3. Transportation and Distribution Management (TDM)

Transportation has become the key component of any successful supply chain system due to growing need for speedier and timely delivery of goods, economies in operation, minimum en-route handling and documentation to minimize transportation cost and particularly, total logistical costs. It helps to build efficient and effective distribution network which affects delivering the right quantity in the right time at the right place. Refrigerated transportation of milk and milk products is important in maintaining the quality and freshness of the agricultural products which involves refrigerated trucks, containers, ship, trains for the transportation of perishable products.

4.1.4. Supplier Relationship Practices (SRP)

SRP entails creating closer and more collaborative relationship with key suppliers in order to uncover and realize new value and reduce risk.Relationship quality can represent a competitive advantage for agri-food supply chains and should therefore be improved using tools of supplier relationship management. Milk buyers can build a loyal base with their suppliers as a mean to secure uninterrupted milk-supplies. One of the major efforts which should be made is that milk buyers are encouraged to use collaborative communication with their suppliers by having frequent communication, proper feedback and adequate information sharing with their supplier which encourages problem solving and avoids misunderstandings in their relationships.

4.1.5. Inventory Management System (IMS)

Inventory management is one of the important concerns to be taken care of in Indian dairy industry because of perishable nature of milk and milk product. Milk and milk products need special cold chain facility for the storage of goods in order to maintain its quality and enhance shelf life. Historically, inventories have been used to manage production and were considered a necessary component of doing business. However, with recent developments such as Just-In-Time (JIT) and Electronic Data Interchange (EDI), this perception is changing. In addition, issues such as transportation modal choice, plant location and transit characteristics impact inventory management.

4.1.6. Customer Relationship Management (CRM)

CRM is a process of providing significant value-added benefits to the supply chain in costeffective way leading to relationship. Customer relationship management CRM refers to utilizing extensive strategies and engineering to

find, obtain and cultivate advantaged customers, and hence maintain long-term partnerships (Sin *et al.*, 2005). Lin *et al*. (2010) investigated the effect of various dimensions of customer relationship management on innovative capabilities. Five dimensions of CRM are information sharing, customer involvement, long term partnership, joint problem solving, and technology based CRM.

4.1.7. Supply Chain Manufacturing Practices (SCMP)

Indian dairy industry is needed a good manufacturing practices (GMP's) in order to assure that milk and milk products are manufactured and stored under safe and sanitary conditions. GMP guidelines are established to satisfy regulatory requirements as well as maintain the high quality standards of your products to your customers. Good manufacturing practices should be followed by dairy plant owners, operators and employees in order to maximally assure the production of safe and sanitary products at all times. There are some guidelines of GMP which offer suggestions for measures and precautions that should be taken regarding employee health, food handling practices, appearance, personal hygiene, plant procedures, plant and equipment design, maintenance, and sanitation. It is important that every employee is made knowledgeable and aware of the necessity of adhering to these guidelines at all times; that the guidelines be re-emphasized on a regular basis; and that regular assessment and review of how well the guidelines are being followed is conducted by management.

5. Antecedents of Marketing Orientation

Kohli and Jaworski(1990) proposed that the market orientation is the implementation of the marketing concept and that it is composed of three sets of organisation wide activities: (a) generation of marketing intelligence pertaining to current and future customer needs, (b) dissemination of the intelligence across department,and (c) responsiveness to market intelligence. Market orientation (MO) plays a central role in marketing management and strategy, with focus on creating superior customer value while pursuing profits (Slater and Narver, 1994).

Marketing orientation in the proposed research model serves as an independent variable to dairy supply chain management (DSCM).The concise definition of each parameter of marketing orientation is defined below:

6. Marketing Intelligence Generation

A market-focused intelligence generation strategy focuses on acquiring information about customers' expressed and latent needs and competitors' capabilities and strategies (Day, 1994; Kohli and Jaworski, 1990; Narver and Slater, 1990). This intelligence provides a focus for the business's product development and sales growth efforts by enabling the business to develop strong relationships with key customers and insights into opportunities for market development. Market-driven organisations develop new intelligence about market requirements and how best to meet or exceed them through superior capabilities at market sensing, customer linking and channel bonding (Day, 1994).

6.1. Marketing Dissemination

Effective dissemination of market intelligence is important because it provide a shared basis for concerned action by different department. No matter how well planned and targeted the intelligence collection effort is, it becomes inefficient if the means and methods of collecting information are inadequate, insufficient or obsolete. Regardless of how much qualitative information is collected, it loses much of its value if it is not properly processed. No matter how well processed the collected information is, it can become a double-edged sword either if it is not properly analyzed, or if the analysis is not transformed into finite and qualitative intelligence products. More importantly, even if all four of the phases above have been successfully carried out, the whole intelligence process will be for naught if the final products of the intelligence process do not reach the final users. Any fails during the dissemination phase of the intelligence process means, in fact, to miss the purpose of the entire intelligence cycle (DeConde, 2002).

6.2. Responsiveness

The third element of the inner component of market orientation is responsiveness itself. Responsiveness is the action taken in response to intelligence that is generated and disseminated. In fact all departments, not just marketing, participate in responding to market trends in a market oriented company. Examples of response are activities such as selecting target market or designing products that match identified needs.

7. Antecedents of Organisational Performance

This model proposes organisational performance as dependent variable of dairy supply chain management practices and the parameters measuring the organisational performance are given below:

7.1. Marketing Performance

These measures can be explained with the some parameters members of item produced, time required to produce a particular item, on-time deliveries (Keebler *et al*., 1999; Forslund and Jonsson, 2007; PRTM consulting 1994; Keebler,Manrodt, Durtsche,Ledyard, 1999; Global logistic research, 1995; Bowersox*et al*., 1989; CLM 1985,1998) extent of product rejection, etc. more specifically sales (Keebler,Manrodt, Durtsche, Ledyard, 1999), profit, fill rate (Keebler,Manrodt, Durtsche, Ledyard, 1999), order capture/tracking time/order cycle time (Forslund and Jonsson, 2007;Kallio*et al*., 2000;Mattsson, 2004; Blackstone and Cox, 2005;Hopp and Spearman, 2001; Supply-chain Council, 2005; Keebler,Manrodt, Durtsche, Ledyard, 1999), customer response time (Keebler *et al*.,1999; Forslund and Jonsson, 2007; PRTM consulting 1994; Kearney 1985; Keebler,Manrodt, Durtsche, Ledyard, 1999), customer complaints (Keebler,Manrodt, Durtsche, Ledyard, 1999) etc. are to name a few.

7.2. Operational Performance

These measures include inventory requirement and levels, personnel requirement, equipment capability and capacity utilization, energy usages and most importantly, costs (total cost, distribution cost, manufacturing cost, inventory holding cost) (PRTM consulting 1994),and return on investment (ROI) (Global logistic research, 1995; Li *et al*.,2006; Mohammad *et al*., 2012).

7.3. Flexibility

Flexibility can be defined as the ability of the focal company to meet the rapidly changing customer, supplier and manufacturer requirement even during stiff competitive tornado in terms of time, volume, variety so as to ensure customer satisfaction.

8. Antecedents of Customer Satisfaction

Kotler (2000); Hoyer andMacInnis (2001) define satisfaction as a person's feelings of pleasure, excitement, delight or disappointment which results from comparing a products perceived performance to his or her expectations. Satisfaction means the contentment one feels when one has fulfilled a desire, need or expectation. Keeping customers happy is of tremendous benefit to companies. Satisfied customers are more likely to stay loyal, consume more and are more likely to recommend their friends to the business.

This model proposes customer satisfaction as dependent variable of dairy supply chain management practices and given below are the various parameters which measure the customer satisfaction.

The concise definition of each parameter of customer satisfaction is defined below:

8.1. Product Quality

Product quality is the product's ability to fulfill the expectations and needs set by the end user. Product quality is generally concern with the physical product attributes (taste, shelf life, etc.). Product quality consists of threeelements regarding freshness of products (meat, vegetables and fruits), durability and product variety. It is the difference between product quality according to the product specification and the realized product quality.

8.2. Reliability

It is defined as ability to perform the promised service dependably and accurately and can be explained with sub-parameter like timely promising services, supply of right products and error free transactions etc.

Reliability refers to how much trust can be afforded the supermarket staff and organisation for example through parameters like accurate billing. "Reliability refers to the promises given by the store. If the store cannot keep or breaks the promises, it dissatisfies customers and results in negative word-of-mouth. In contrast, when the company is able to keep its promises, it increases customer confidence in the store and creates customer satisfaction and lead to loyalty", Yuen and Chan(2010).

8.3. Problem Solving

Problemsolving is a process that involves discovering, analyzing and solving problems. The ultimate goal of problem-solving is to overcome obstacles and find a solution that best resolves the issue. It can be clarified with sub-parameter like sincerity in problem solving, handling customer compliance, and return and exchanges.

8.4. Value for money

Value for money is the perceived level of quality relative to the price paid for a product or service. Value of money is based on competitive pricing of products, discounts awarded to customers, and promotions. Furthermore, customer value for money is the overall assessment of the utility of a product based on perceptions based on what is received and what is given. Sirohi*et al*. (1998) define value as "what you get for what you pay for".

8.5. Services

The degree of services provided to customer besides the delivery of the ordered product includes offering a variation in product assortment, making a commitment to each customer as an industry entityand providing after sales support.

9. Conclusion

Highly competitive Indian dairy industry poses threat/ challenges for the survival in the Indian dairy market. In such situation, DSCM practices can help the Indian dairy companies. Various literature suggest that through DSCM practices dairy companies can improve their organisational performance and helps providing customer satisfaction to their end consumers in terms of product quality, price, reliability, problem solving, value for money and finally services. The entire competition in dairy industry revolves around two prominent factors i.e. quality and availability. Quality and availability for dairy products become crucial due to high degree of perishability related with the milk and milk products, which requires altogether a different kind of supply chain commonly known as cold chain which can only be achieved by good dairy supply chain management (DSCM) practices. DSCM practices also believed to provide a competitive edge which is ability of an organisation to create a strong position over its competitors. This argument was also supported by the father of India's white revolution Dr. Varghese Kurien who said that the future of India dairy industry can be only built on quality and quality alone. Moreover, it can be achieved by practicing good dairy supply chain management (DSCM).

In order to achieve maximum competitive advantage through the supply chain, the supply chain must be performing at its best else anything it has gained will be short-lived. Yet, many dairy companies are not aware of how their supply chain is performing or even what kind of supply chain they are in (Marshall, 1997). Several researches have argued that dairy industry is ushering in a new era where organisational performance, customer satisfaction and competitive edge over the others will be linked to dairy supply chain performance.

Firms have created superior performance, at least in part,beating rivals through their unique dairy supply chains practices. Performance is influenced by how well supply chain knowledge development capacity and intellectual capital efforts complement alternative chain strategies. More specifically, each strategy type requires different constellation of knowledge development capacity and intellectual capital to enhance action and create superior firm performance. It highlights the importance of supply chain phenomenon for firm level performance and the value of supply chains as a competitive weapon for contemporary firms (Christopher *et al*., 2009).

Most of the Indian organisations have aligned their supply chain objectives with their business objectives and they are now on course of aligning their processes and management focus. Sahay *et al*., (2006) revealed that enhanced level of competitiveness would require Indian organisation to manage the three dimensional alignment (alignment of supply chain objectives with business objectives, supply chain processes with management tools and supply chain focus areas with management focus) of achieving the agenda set by the business strategy. Improved dairy supply chain efficiency will help Indian organisations to maintain competitiveness in a rapidly globalizing economy. There exists a significant positive relationship among three types of SCM capabilities (outside-in, inside-out, and spanning) and business performance i.e. perceived customer value, customer loyalty, market performance and financial performance (Tracey *et al*., 2005). Strategically developing DSCM capabilities such as efficient inbound and outbound transportation (using bulk refrigerated cooler for the movement of milk and milk product so that they does not get damaged), warehousing and inventory control (cold storage of milk and milk products), hygienic manufacturing practices (which offers suggestion for measures and precaution

that should be taken regarding employees health, food handling practices, personal hygiene, plant procedure, plant and equipment design, maintenance and sanitation etc.), packaging (use of modified atmosphere packaging, MAP in order to enhance the shelf life of milk and milk products), information and communication technology (ICT), supplier relationship practices (SRP), customer relationship management (CRM), order processing and information dissemination enables dairy companies to identify and take advantage of opportunities in the global marketplace. It is also found out through various literatures that marketing orientation help in enhancing dairy supply chain management (DSCM) which is implementation of marketing concept and composed of three sets of organisation wide activities: (a) generation of marketing intelligence pertaining to current and future customer needs, (b) dissemination of the intelligence across department, and (c) responsiveness to market intelligence (Kohli and Jawarski, 1990), which finally lead to enhance the organisational performance and provide customer satisfaction to their end consumers.

Now-a-days competition is increasingly between supply chains rather than individual companies (Christopher, 2000). Thus, the present study expects dairy supply chain management (DSCM) to be the key in maintaining firm's competitiveness and designing and operating efficient dairy supply chain through the effective use of information technology, which will further help dairy companies to achieve competitive advantage through improved organisational performance.

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