Arth Anvesan

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Special Issue on "Strategic Dimensions of Value Chain for Sustainable Development

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EDITORIAL

Arth Anvesan Volume 8, Number 1 is a special issue consisting of few selected papers, presented in the One Day UGC sponsored National Seminar on "Strategic Dimension of Value Chain for Sustainable Development", organized by College of Management, Shri Mata Vaishna Devi University on 1st Sept 2012. According to Michael Proter, value chain is an important construct for understanding the distribution of returns arising from design, production, marketing, coordination and recycling. Value chain is a series of activities the firms undertake in order to deliver a valuable product or service for the market. The objective of this one day national Seminar was to create a common platform for discussing different dimensions of Vaule Chain. Publishing the Special issue of Arth Anvesan is one step frontward towards this path.

Sincere thanks are due to the Seminar Convener Dr. Sunil Giri and Organizing Secretary Dr. Saurabh for their support to incorporate the best presented papers in this special issue of Arth Anvesan. Hope, it will serve the purpose of knowledge sharing in the field of value chain and its strategic role in gearing the organizational efficiency.

Six selected papers are included in the current volume following the double blind peer-reviewed selection process to retain uniqueness, relevance and readability of the submitted articles. The first article by Navdeep Kumar explains the strategic dimensions of value chain management for enhancing the competitiveness of food processing industry in Punjab. Ashok Aima, Anjali Pathania and Harleen in their paper highlight the use of repatriate knowledge in leveraging the knowledge value chain of the organization. They suggest that knowledge possessed by these key individuals is the main asset empowering corporations to compete in the global market. The third article by Rakesh Kumar and Sumeet Kumar Sharma have envisaged that if supply firms incorporate strategies to prevent spoilage of perishable goods during queuing, that can translate into significant earning of revenue. A single server, finite capacity, Markovian queuing Model with retention of reneged customers at one supply chain node was adopted by the authors. Gaurav Sehgal in his paper has attempted to study the Supply Chain Practices of Small and Medium Enterprises. He tries to find out the impact of environmental ambiguity on the Supply Chain Management Practices of a firm. In the next paper, Meenakshi Gupta and Syeda Shazia Bhukhari empirically studied the value chain analysis of poultry farming in Jammu region. In the concluding paper, Bimal Jaiswal has tried to establish the relationship between buyer and seller, which is evolving necessity in present globalized era to survive and achieve better margins.

This special issue of Arth Anvesan is compiled with an objective to lay special emphasis upon the evolving topic of Strategic Dimensions of Value Chain for Sustainable Development. However, in general this Journal also covers wide range of fields like finance, human resources, marketing, supply chain, economics and other related subjects. We at, College of Management, invite original empirical works, case studies, book reviews for future issues of this bi-annual referred journal, brought out by college of Management, Shri Mata Vaishna Devi University.

Dr. Kakali Majumdar

FROM ORGANIZING SECRETARY

The world has moved a long way from low cost supply to the quality material supply and hence from value oriented to value driven supply for the buyers. The various concepts of the value chain have been discussed time and again. The strategic dimension of value chain was emphasized first by Michael Porter in terms of his generic value chain which brings out that a "firm is a synthesis of activities performed to design, produce, market deliver and support its product". The firm had nine identified value creating activities which can have strategic implications. But this value chain model provides only a micro view of firms' exchanges analysis by considering the flow of goods and services from raw materials to consumption, as a unit of analysis.

The value chain today is important as it helps in understanding the future linkages of growth, not only at the level of local economy but also from local to regional and from regional to global. It creates air advantage in view of the changes that are happening at the global level to ensure better avenues of the resources as well as the mobilization of the resources. The value chain plays a key role in understanding the need and scope for systemic competitiveness. Value Chain analysis and identification of the core competencies lead to the strategic focus areas of the firm. It further helps the firm to identify the current and future sources of core competencies that would lead the firm to outsource the functions where it has no distinctive competencies, behavior of the input determinate over the output, sources of innovation and up gradation and also improvement in the overall performance of the firm.

In the Indian context, the value chain concept is increasingly important even for local, national and regional markets. For development and poverty alleviation, value chain thinking means improving the flow from production to consumption, thereby stimulating economic growth as well as allowing resource-poor actors to generate income. A critical concern is how markets can work better for the poor. This requires developing policies that can stimulate the conditions for poor households to gain access to the economic opportunities. Critically important also is to provide assistance to small-scale producers to develop their entrepreneurial skills and secure access to the services (finance, information, technology, etc.) that they need.

The papers chosen for this special issue of 'Arth Anvesan' are the output of the seminar Strategic Dimensions of Value Chain for Sustainable Development" by College of Management, Shri Mata Vaishno Devi University Katra, J&K supported by University Grants Commission, New Delhi. These papers share the information and knowledge in the field of value chain and its strategic role in gearing the organizational efficiencies. The papers selected signify in the key result areas of the value chain analysis, the forecasting tools for the value chain, and its growing importance for making the best of globalization.

The first paper Value Chain Analysis and Industrial Competitiveness – Synergies and Strategies focus upon the competitiveness of the food industry in the setting of Punjab. Based on primary and secondary data analysis the study brings out the importance of value chain in the competitiveness of the manufacturing units.The second paper Leveraging Knowledge Value Chain: Some Reflections Of Repatriate Workforce takes in from the manufacturing to the knowledge value chain. The paper brings out the importance of repatriate to be treated as a source for knowledge due to its international experience and its linkages to leverage in managing foreign operations, acquiring new businesses abroad or increasing international skill of home employees. Third paper Selection of Spoilage Prevention Strategies in Supply Chains Using Queuing-Theoretic Approach is an analysis of a real time issue of managing the supply chain of perishable items due to long congestions through approporiate strategies. The paper propose a single server, finite capacity, Markovian queuing model with retention of reneged customers to model this situation at one supply chain node. The paper stuies the long term behavior as well as cost- profit analysis of the proposed

model in order to guide the supply chain forms to choose better spoilage prevention strategy. Forth paper Study of Environmental Characteristics Impact on Supply Chain Management Practices in SMES proposes that an adaptive supply chain structure has become imperative for the Small manufacturing units in the period of high uncertainty due to environmental factors. The fifth paper Value Chain Analysis of Poultry farming in Jammu Region- An Empirical Study evaluates the margins of the value chain partners in the poultry business in Jammu. The paper concludes the issues faced by the various channel partners and provides suggestions for future efforts in order to sustain the business. Sixth paper Buyer- Seller Interaction: A Collaborative Approach brings out the discussion over how the dyadic relationship of buyer and sellers creates new platforms for competition and struggle for the organizations..

All the papers selected for publication in this special issue range to address the possibilities of value chain as a heuristic device as well as the analytical tool for sustainable development. The research papers published in this special issue of "Arth Anvesan" have passed through various stages of selection for presentation in the seminar. Out of more than forty presentations twenty papers were selected as suitable for review for publication. With regular interaction and the suggestions with the referees through a strict blind fold method these article were consistent in improving their quality. Hence these papers are presented in this special issue and I am certain that it would add value to the literature and understanding of value chain strategies for sustainable development.

Dr. Saurabh

CONTENTS

VALUE CHAIN ANALYSIS AND INDUSTRIAL COMPETITIVENESS – SYNERGIES AND STRATEGIES

Navdeep Kumar[*]

Abstract
With the onset of globalisation, enhancement of competitiveness is a pre-requisite for sustainable growth and development in the competition regime. Competitiveness is a multi-dimensional concept that entails diverse strategies for creating global competitive advantage. Value Chain Analysis is a key strategy for stimulating competitiveness by focusing on core competencies to enhance competitive position of an organisation in the global arena. The Indian food processing industry has a large potential for growth and expected to play a significant role in terms of ensuring food security and contributing to India's share in global trade. Against this backdrop, the present paper intends to analyse the strategic dimensions of value chain management for enhancing the competitiveness of food processing industry in Punjab. The present study is based on primary as well as secondary data. The study clearly points towards the strategic impact of Value Chain Analysis for the enhancement of competitiveness in the light of emerging challenges. The paper concludes with certain suggestive measures as well as identification of further areas of research in this context.
Key Words: *Competition, Value Chain Analysis, Core Competencies, Industrial Competitiveness.*

JEL Classification L14, L91

INTRODUCTION

Competitiveness is the creation of efficient industrial capacity in developing countries to cope with more intense global competition. Competitiveness is a multidimensional concept in the sense that being competitive requires superiority in several aspects. The opening up the economy to the world trade provides competitive pressure to domestic industry. Rationale behind this is that competition induces the producers of tradable goods and services to become efficient through modernization, adoption of new technologies and cost efficiency. Under a competitive regime, only the best and most efficient would survive and the inefficient would be wiped out. This naturally resulted in the most efficient use of the community's resources. Under competitive conditions in a market, the resources are used most efficiently; there is incentive to invest, innovate and increase efficiency; ability gets it's due reward; reasonable prices and all this leads to the maximization of welfare of the community.

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The value chain analyses is a systematic way to the sources of competitive advantage by disaggregating a firm's strategic activities that are performed to design, produce, market, deliver, and support its products. A firm gains competitive advantage by performing these strategically important activities more cheaply or better than its competitors (Porter 1990). Thus, differences among competitor value chains are key sources of competitive advantage. The Indian food processing industry has a large potential for growth and expected to play a significant role in terms of ensuring food security and contributing to India's share in global trade. India has been an agriculture economy and a drive on food processing would be a step further in the value chain and make the Indian economy robust. Value Chain Analysis is a key strategy for stimulating competitiveness by focusing on core competencies to enhance competitive position of an organisation in the global arena.

DATA BASE AND METHODOLOGY

Against the above backdrop, the present paper intends to analyse the strategic dimensions of value chain management for enhancing the competitiveness of food processing industry of Punjab in the light of emerging challenges and policy implications in this context. Punjab is endowed with rich agricultural base and it is popularly known as wheat basket of India. The state offers rich fertility, gamut of incentives and packages for the growth of agricultural output and carries immense potential for food processing industrial units. In the present study, three districts from the state of Punjab have been selected i.e. Gurdaspur, Pathankoat and Hoshiarpur for primary survey besides secondary data collected from various publications and websites. The primary data have been collected through a questionnaire. Ten units of food processing industry in each of the district selected for the present study. Different sets of data were classified and tabulated for carrying out detailed analysis of responses from surveyed questionnaire and discussion held with entrepreneurs of food processing industry.

COMPETITIVENESS OF THE INDIAN FOOD PROCESSING INDUSTRY – AN OVERVIEW

A central issue in the economic debate on competitiveness is the creation of efficient industrial capacity in developing countries to cope with more intense global competition. This has drawn attention to mechanisms of technological advancement in developing economies, which lie behind international technological frontiers (Wignaraja, 2003).

Competitiveness is a multidimensional concept in the sense that being competitive requires superiority in several aspects. Competitiveness has been defined as the degree to which a country can, under free and fair market conditions, produce goods and services, which meet the test of international markets, while simultaneously maintaining the expanding the real incomes of its people over the long run. Competitiveness is the ability of firm to do better than comparable firms in sales, market share, or profitability. Improving competitiveness is central to raising the underlying rate of growth of the economy. It is about creating a high skills, high productivity and therefore high wage economy where enterprise can flourish by removing the impediments to investments and

improving the efficiency of the economic resources. Competitiveness in industrial activities means developing relative efficiency along with sustainable growth. Competitiveness is thus more a process than an absolute state, and can only be assessed in a relative sense.

The capacity of domestic industries to innovate and upgrade, strong domestic rivals, aggressive home-based suppliers and demanding home markets also reflects competitiveness of the industrial sector. It calls for domestic firms to adopt highly efficient and productive methodologies such as faster innovations, effective marketing strategies and most appropriate labour-capital-resource combinations in production activities. Sound macroeconomic conditions, trade liberalisation and an emphasis on supply side factors such as FDI, technological effort, human capital and communications infrastructure are closely associated with better competitiveness performance in the developing world. Other policy measure includes R&D, tax incentives and subsidies, initiatives for stimulating collaborative innovation, finance for innovation and technology (Fagerberg, 1998; Wignaraja and Taylor, 2003 and Metcalfe, 2003).

Agriculture accounts for about 1/4th of the Indian economy and there is immense potential for the agriculture sector as well as for the food processing sector. Food processing sector covers activities such as agriculture, horticulture, plantation, animal husbandry, fisheries and other industries that use agriculture inputs for manufacturing of edible products. The food-processing sector employs about 13 million persons directly and about 35 million persons indirectly. India ranks first in the world in production of cereals, livestock population and milk. It is second largest fruit and vegetable producer and is among the top five producers of rice, wheat, groundnuts, tea, coffee, spices, sugar and oilseeds. This gives it the unique advantage and tremendous potential for processing of agriculture produce. India's agricultural production base is quite strong but at the same time wastage of agricultural produce is massive. The Global Processed Food Industry is valued at US $ 3.2 trillion and accounts for over 3/4th of global food sales. Despite the large size of the industry, only 6% of the processed food is traded the world over as compared to bulk agricultural commodities where 16% of produce is traded. The USA is the single largest consumer of processed food and accounts for 31% of the global sales. This is because as countries develop, high quality and value-added processed food such as convenience food is preferred over staples, which are prevalent in less developed economies (GOI, 2008).

The processed food industry is divided into the following broad segments:
Primary Processed Food – which includes products such as fruits and vegetables, packed milk, unbranded edible oil, milled rice, flour, tea, coffee, pulses, spices, and salt, sold in packed or non-packed forms.

Value-added Processed Food – which includes products such as processed fruits and vegetables, juices, jams, pickles, squashes, concentrate, processed dairy products, processed poultry, processed marine products, confectionary, chocolates, alcoholic beverages.
India is at the advantageous position in this sector both from demand and supply side. From demand side, growing per capita income is a great boost for the generation of demand for processed food items. As income of the people increases, they began to prefer

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processed foods to raw one. From supply side, dominance of agriculture in the Indian economy and diversity of agricultural products provide potential for the growth of this sector. However, processing level is very low i.e. around 2.20% in fruits and vegetables, 35% in milk, 21% in meat and 6% in poultry products, etc. India's share of processed food is about 1.6%. Hence, there is immense potential for investment in this sector. To facilitate the prompt growth of food processing industry, the Government has implemented the scheme for infrastructure development comprising a food park scheme, establishing packaging centres, integrated cold chain facility, value added centers etc.

Mynit (1971) advocates that the food processing industries in the developing economies have great export potential as the exports of processed food is much in demand that the raw food products.
With the opening of the economy, it has been realized that there is a global market for processed food. This is encouraging Indian firms to enter into the food-processing sector. However, the industry is still in a nascent stage and the competitiveness of the Indian food processing industry can be enhanced to a large extent through proper policy formulation. The major potential of Indian Food Processing Industry lies in availability of raw material and change in consumption pattern owing to increase in income. The key constraints include lack of adequate infrastructure, high processing cost, non-availability of trained manpower and inadequate R&D.

The state of Punjab which is called Food Basket of India produces about 70 percent of wheat and 50 percent of rice of India. The state has a potential to become food processing hub of the country (Dhiman and Rani, 2011).

Value Chain Analysis is vital for enhancing the competitiveness of food processing sector that leads to reduction in wastages, ensure value addition, additional employment oppurtunitiers as well as export earnings that leads to better socio-economic conditions of farmers (GOI, 2010).

Value Chain Analysis for Enhancing the Competitiveness of Food Processing Industry of Punjab:
The value chain is a systematic way to enhance competitiveness by disaggregating a firm's strategic activities that are performed to design, produce, market, deliver, and support its products. All these activities can be performed by using a value chain. A firm gains competitive advantage by performing these strategically important activities more cheaply or better than its competitors (Porter 1990). Thus, differences among competitor value chains are key sources of competitive advantage.

Table 1
Constituents of a Generic Value Chain

PRIMARY ACTIVITIES	SUPPORT ACTIVITIES	
Inbound Logistics	*Procurement*	
Operations	*Technology Development*	
Outbound Logistics	*Human Resource Management*	Margin
Marketing and Sales		
Service Activities		

Value chain analysis can be used to formulate competitive strategies, understand the source(s) of competitive advantage, and identify and/or develop the linkages and interrelationships between activities that create value. A value chain is a way of conceptualizing the activities that are needed in order to provide a product or service to a customer. It depicts the way a product gains value (and costs) as it moves along the path of design, production, marketing, delivery, and service to the customer. Competitive strategies are based on integrating activities in the value Chain. There is a distinct interconnectedness of R&D, production, marketing, and information systems. Since there are many linkages and interdependencies among activities, the ability to co-ordinate interrelationships is critical to achieving competitive advantage. Integration can increase a firm's capacity to implement strategies, e.g., respond quickly and effectively to market forces, improve its response to customer needs, and reduce costs. Competitive strategies focus on activities needed to increase the value of a product or service (Ensign, 2001).
Rapidly changing market conditions require that firms and other actors—whether competing or collaborating—share a common understanding of what is required to be competitive in an end market. Some level of cooperation is necessary for a value chain to achieve competitiveness and consequently firms need to have a shared vision for their success.

Value chain competitiveness is the ability of actors within an industry to:
- Anticipate and meet buyers' demands
- Identify and take advantage of end-market opportunities
- Respond to changes in market demand or the competitive landscape

India is at the advantageous position in food processing sector both from demand and supply side. From demand side, growing per capita income is a great boost for the generation of demand for processed food items. As income of the people increases, they began to prefer processed foods to raw one. From supply side, dominance of agriculture in the Indian economy and diversity of agricultural products provide potential for the growth of this sector. The food & agro processing industry has a long and intricate value chain. The different components of the value chain play varied role in the process before the end product reaches the final consumer. The initial point of value chain of food processing starts from the agriculture produce and the value chain moves forward in terms of increasing value add to the agricultural produce. The food and agro processing is primarily required because of the seasonality of agricultural produce, geographic dispersion of agricultural produce and convenience in consumption. Agricultural produce are mostly perishable and hence they have limited life within which they need to be consumed. Agricultural produce are also regional in nature and depending on

geographical conditions and one agricultural produce may be abundantly grown in one region than another (ILO, 2006).

To analyse the competitiveness, it is crucial to define a firm's value chain for competing in a particular industry. The components of value chain of the food Processing Sector is shown in Table 2

Table 2
Components of Value Chain of the Food Processing Industry

| *Agriculture Production* |
| *Suppliers to Farmers* |
| *Value Addition* |
| *Broker / Distributor* |
| *Retailer* |

Agriculture Production: Farmers or producers are at the base of the value chain which are engaged in production of the base inputs for food processing. Farmers in turn depend upon their own sets of suppliers. These suppliers to farmers provide base inputs like seeds, fertilizers and agricultural equipments and machinery.

Suppliers to Farmers: It includes manufacturers of fertilizers, seeds, agricultural equipments and R&D institutions engaged in developing better quality seeds.

Value Addition: This category includes entities who are engaged in making value addition to the farm produce. Essentially, food processing is undertaken to increase shelf life, create convenience of use and create greater market for the product.

Broker / Distributor: Brokers / Distributors help in creating a wide market in the processed food industry. These entities create the necessary infrastructure for procuring bulk output of the food processors and then distributing them across markets.

Retailer: Retailers are the interface for the consumers bringing the processed food from the distributors to the consumers. These entities provide convenience of place. They act as last mile connectivity between the food processors and the end consumers.

Value chain is a system of interdependent value activities and linkages within the value chain are crucial in ensuring competitive advantage of a firm. For instance, the procurement process involving quality and cost of raw material, delivery time etc plays a crucial role in affecting the manufacturing cost as well as quality of final processed food products. Information

systems are often vital to gaining competitive advantages from linkages. Thus, effective management of linkages is a more complex organizational task than managing value activities themselves.

FINDINGS

The main findings of the survey focused on the strategic role and constraints of value chain analysis in enhancing the competitiveness of the food processing industry in Punjab are summarized as given below:

- ➢ Lack of adequate infrastructure facilities such as transportation, power supply and storage facilities is the most important are the main constraints of food processing industrial units that leads to low level of processing and increased cost.
- ➢ Inadequate level of investment in R&D due to lack of resources and initiatives resulted in the lower quality products at higher cost.
- ➢ About 90% food processing units constitutes of small scale level and the most of the government schemes are more favourable for large food processing units which adversely affect the competitiveness of small scale units.
- ➢ Natural climate also plays important role in determining the supply of raw materials to the industries.
- ➢ Inefficient marketing networks are failing to promote local brands in the national and international levels.
- ➢ Lack of uniformity in taxes among various states is also a key issue of concern for the growth of the industry in the state.
- ➢ There is also lack of incentives for the food processing units and there is no specific as well as lack of awareness for the training and promotion measures in the state.

POLICY IMPLICATIONS

The following policy implications can be drawn from the findings of the study as discussed below:

- ✓ There is a dire need to enhance the level of processing by removing the infrastructural bottlenecks by providing better infrastructure facilities through the public private participation.
- ✓ The wastage of agricultural produce also leads to decline in the competitiveness of the food processing industry. Efforts are required to minimize the wastages to enhance the productivity and competitiveness.
- ✓ There should be special training institutes to impart education to the entrepreneurs to address their needs particularly to fill the skill gap which is essential for survival and growth.
- ✓ In order to tap the national as well as international markets, quality aspects at each level of value chain needs to be given due attention as per global standard practices.
- ✓ Efforts are also required to increase the level of investment in R7D for product development, technology up gradation and packaging.
- ✓ There is also a need to introduce uniform tax rate system in all the states for the comprehensive sustainable development.

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✓ Immediate steps are also needed for brand building of Indian food products by strengthening market intelligence.
✓

CONCLUSIONS

Food processing industry has immense potential in the state of Punjab and the strategic use of value chain analysis is a powerful tool for enhancing the competitiveness of the industry by focusing on efficiency, differentiation and market focus. A food processing unit which identifies its value activities and take benefit of both supplier and buyer value chains would surely have competitive advantage over its rival firms. It requires concerted efforts to focus on the core competencies in a strategic manner. In this context, the present study also provides scope of further research in the areas including Skill Gap in Food Processing Industry in India, Public Private Partnership for Infrastructure development in Punjab and Technology up gradation in food Processing Industry. To conclude, there is a dire need to harness the potential by exploiting the opportunities and elimination of constraints to the possible extent at each and every stage of value chain to enhance the competitiveness of food processing industry in Punjab.

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LEVERAGING KNOWLEDGE VALUE CHAIN: SOME REFLECTIONS OF REPATRIATE WORKFORCE

Ashok Aima*, Anjali Pathania** and Harleen**

Abstract

Present century is witnessing massive resource mobilisation of phenomenal magnitude on global scale transcending the 'time and space barrier' thereby unleashing intense competition making it imperative for individual business entities to seek sustainable solutions to the business operations. As such knowledge management has become a critical component for business corporations so as to compete effectively in the world marketplace. In this context following two important issues have emerged which impact business outcomes: to acquire an increased internationally skilled workforce and to ensure optimum resource use efficiency .

Repatriates are the obvious resources to help fulfil both needs. With their versatile exposure, repatriates acquire bi-cultural competence and KSAO's (knowledge, skills, abilities and other domains of expertise) and therefore can act as mentors to the members of the organisation by imparting knowledge and skills like transfer of new technology managing cross-culturally, negotiating in a specific culture and communicating effectively in a host culture, tough they are often the forgotten employees – both in business and in international management literature. There is a particular lack on linking repatriation, knowledge management and why some companies do a better job in using their repatriates' knowledge. Thus this paper highlights the use of repatriate knowledge in leveraging the knowledge value chain of the organisation. Its focus is on repatriates as a resource whose international experience and knowledge could be used for managing foreign operations, acquiring new businesses abroad or increasing international skill of home employees.

Keywords: Repatriates, Bi-cultural competence, Knowledge management, Knowledge value chain

JEL Classification D83, J21

INTRODUCTION

Globalisation has been on the rise leading to the basic requirement for businesses to have internationally skilled personnel. Competitive pressure has been rising simultaneously creating the need for companies to make the best possible use of all their available resources. According to the resource based view of the firm, resources need to be scarce, of value, hard to imitate and not substitutable in order to be able to deliver a sustained competitive advantage. While technology, efficiencies of scale and advantages of location start to become easier to copy or imitate, intangible resources and knowledge/skill of people gain in importance (Pfeffer 1995, 6).

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According to Haanes & Fjeldstad 2000 (52ff) knowledge can be of specific importance to creating a competitive advantage if not only passively available but actively put into actions within the organisation. This thought is also mirrored by Barney & Wright 1998 saying that resources need to be used to generate value (either by increasing sales or decreasing cost) in order to be strategic resources. A resource which can potentially possess these characteristics are repatriates and their international experience and knowledge, which could for example be used for managing foreign operations, acquiring new business abroad or increasing international skill of home employees. Repatriates shall in the following be defined as managers returning from an expatriate assignment abroad. Expatriates in this context are employees who for a limited period of time work for a foreign subsidiary, affiliate or joint venture and thereby move their centre of life to the foreign country. Repatriates have up to now often been the forgotten employees for many companies.

Repatriation can clearly be seen as the Achilles' heel of international human resource management (Stahl & Cerdin 2004, 896). This problem does not only hold true for businesses, but is also reflected in research. The specific area of combining repatriate management with knowledge management is even more under researched. Seeing repatriates as a resource and putting attention to their knowledge could help to mitigate the fluctuation risk while at the same time utilizing an important resource to the company. On top it could provide an opportunity to avoid a risk to the pipeline of new expatriates when they start to hesitate if they should take a foreign posting in view of the risk of harming their future career upon their return (Andreason & Kinneer 2004), as well as to avoid a risk of losing valuable information to a competitor when repatriates change to a place where they feel their experience is higher valued (Oddou, Osland & Blankeney 2009, 183).

Research Question

This leads therefore to an important question –
How do some companies make better use of their repatriates than others and how it creates competitive edge for them?

LITERATURE REVIEW

The combination of repatriates and knowledge management has had very little research so far. The fact that repatriates acquire knowledge while being abroad can be found in many papers dealing with repatriation, but the description of the knowledge acquired is often only descriptive (e.g. in Adler 1997, 247 or Kühlmann 1995, 190). The first model developed describing repatriate knowledge comes from Berthoin Antal 2000. Another slightly different proposal is the knowledge diamond as presented by Fink, Meierewert & Rohr 2005. Both models clearly show the extensive knowledge repatriates acquire abroad and the strategic resource repatriates therefore could be for an organisation. Papers on knowledge transfer are however even more scarce than the ones describing the knowledge itself. Only one conceptual model has been presented so far by Lazarova & Tarique 2005, but no empirical validation has yet been published. While there is some work on knowledge transfer in multinational organisation and by expatriates during their time abroad (Bendt 2000, Bonache & Brewster 2001, Minbaeva & Michailova 2004), there is hardly any mentioning of factors influencing knowledge transfer upon the return.

The only exception are the above work of Lazarova, the contributions of Berthoin Antal 2001/ Berthoin Antal & Böhling 1998 on expatriates and organizational learning and the very recently published article of Oddou, Osland & Blankeney 2009, being the first article looking specifically at factors influencing repatriate knowledge transfer. Finally, the last piece in order to complete the picture on literature available on repatriate management is the contributions within the area of people management giving companies advice on how they can improve their repatriate management. This is the area with the highest quantity of publications. Some better known contributions are by Tung 1988, Frazee 1997 Adler 1997 or Allen & Alvarez 1998.

The above brief review of literature available on repatriate management shows a clear need to further expand on the area of repatriate knowledge management especially in view of the impact this could have on repatriate retention and the ability of a company to make the best use of their internationally skilled resources. The existing research is however an important basis for being able to make the best possible use of repatriates.

REPATRIATES: KNOWLEDGE RESOURCE

Repatriates is not only a key resource to the knowledge about the host country's market and economy, but also the important channel for transferring the knowledge across nations, they are the company's vital human capital. Usually, repatriates will gain five kinds of knowledge during their overseas assignments:

First, Market related knowledge:
Antal and Martin pointed out respectively that market related knowledge is a necessary condition for a company to operating successfully in a given market. Under different circumstance, repatriates will learn to understand the new environment, they can gain the knowledge relate to the given market, such as local language, custom and business operating modes.

Second, Personal skills:
These individual skills have a wide range, such as cross-culture , openness, confidence, flexibility and tolerance. Mayhofe and Adler indicated the improvement of repatriates' these kinds of skills.

Third, Managerial skills related to job:
For the different working environment, repatriates should improve their managerial skills. Downes and Thomas manifested that their communication skills, project management skills and problem-solving skills will all be improved.

Fourth, Network knowledge:
Adler and Martin showed that repatriates' social network will be established and extended. When they are doing business in the host county, they will interact with lots of local and foreign people, then their social network will be established, they can also extend their network in parent country.

Fifth, General managerial knowledge:
This kind of knowledge will help them become the candidates for senior management positions. Concerning the five kinds of knowledge, comparatively speaking, some of

them can be coded and transferred to company's employees easily, such as market related knowledge, they are called explicit knowledge. Some can be transferred partly, such as network knowledge, however, others can be transferred hardly or not, for instance, personal skills, job related managerial skills and so on, they are called tacit knowledge. In order to get benefits from the knowledge, the company should put emphasis on repatriates management and motivation, and promote their knowledge transfer to the company. The useful knowledge which was arising from and be transferred by the repatriates, can be seen as valuable asset which is hard to copy, company can preserve and develop this kind of asset, and transfer it into rare competitive advantages in competition between companies, which is impossible to imitate. However, if the company can't be aware of the value of repatriates' knowledge, or apply the assets without appropriate human resource policies and practice, it will lead to knowledge spillage, then the under-valued asset will bring lose to the company in global competition. Therefore, the importance of the repatriates' asset attribute should be well appreciated.

CHARACTERISTICS OF REPATRIATES' KNOWLEDGE TRANSFER

In terms of the analysis about the repatriates knowledge asset attribute above, we can indicate
that knowledge transfer consist of explicit knowledge transfer and tacit knowledge transfer. Market related knowledge is explicit knowledge, it can be exchanged between individual employees easily, while something like personal skills, or job related managerial skills, which is hard to code, express or formulate, cannot be transferred easily. Therefore, in order to enhance knowledge transfer effectively, we should focus on understanding the characteristics of tacit knowledge, these characteristics can be summarized as:
(1) *Implicitness :* Knowledge acquisition needs personal to experience, practice and understand.
(2) *Exclusivity:* Individuals take the gained knowledge as a part of status and self-worth, so usually they do not want to share it with others free of charge.
(3) *Situation:* Tacit knowledge is different when situation changes.
(4) *Accountability:* Personal knowledge is directly related to personal performance in company, which determines the wealth and status individual will get.
(5) *Contribution:* Personal knowledge forms organization's knowledge, which is the basis of company's sustainable competitive advantages, and will contribute to the competitiveness of the company.

KNOWLEDGE TRANSFER PROCESS

In order to be able to understand what factors influence the knowledge transfer, it is important to look at the process of knowledge transfer itself. Szulanski 1996 describes it as a four step process starting with a need to transfer knowledge followed by the transfer itself, the first application up to routine application of the knowledge. Szulanski's model is especially important, as it does not see knowledge transfer as a one way process. He insists that the need to transfer needs to be coming from the receiving location and that the transfer does not stop at the transfer, but can only be seen as completed once the

knowledge is actively and routinely applied. The limits to Szulanki's model are the lack of looking at different types of knowledge to be transferred, as well as the lack of looking at the environment in which the knowledge is transferred. The probably best known and highest referred to model comes from Nonaka & Takeuchi 1997. Nonaka/Takeuchi's main contribution is the fact, that they show different methods of transferring knowledge for tacit and explicit knowledge. Concretely, they talk about four types of knowledge transfer – socialization for the transfer of tacit to tacit knowledge like in an apprentice-trainer relationship, externalization for the transfer of tacit to explicit knowledge in order to make tacit knowledge codified, combination as the creation of new knowledge of different explicit knowledge and finally internalisation for the transfer of explicit knowledge to tacit knowledge like the learning experience in a training or by reading a manual. But also the context of knowledge is addressed by Nonaka/Takeuchi's model by introducing the four Bas the needed context for each of the four transfer types (Nonaka, Toyama & Byosière 2001, 500). According to Nonaka/Takeuchi, the combination of the four transfer types leads to a spiral of knowledge creation. Another very context focused contribution is the system theory based model of Inkpen & Dinur 1998. Central element to this view on the knowledge transfer is the concept of knowledge spectrum, which describes the totality of the knowledge an organization could make use of, the concept of knowledge state – the knowledge an organization is currently using and the concept of knowledge pockets - a specific piece of knowledge. Both areas are surrounded by an environment, which Inkpen/Dinur describe by five contextual dimensions (culture, strategy, decision making structure and processes, environment and technology). For transfer of knowledge to be possible, the knowledge pocket to be transferred needs to be part of the knowledge state of the sender, but also the knowledge spectrum of the receiver. If this overlapping of the knowledge spectrum is not given, then the knowledge pocket is not connectable to the existing pool of knowledge of the receiver. The concept of overlapping culture can also be found by Ghoshal & Bartlett 1988, who showed that normative integration (shared values, strategies and goals) between headquarter and its affiliates can help the knowledge transfer. A fourth very different way of looking at knowledge transfer is the social viable system model by Yolles 2007 – a metamodel which can be applied to various contexts. Key element are two processes - autopoieses, the process which allows nominal activities to manifest themselves in events and autogenesis which steers the process of autopoieses – and three domains – the existential domain, which comprises culture, paradigms and worldviews, the noumenal domain, which comprises interpretation mechanisms like systems of thought and images, as well as the phenomenal domain, which comprises local actions like structure and behaviours. The model can also be used to describe pathological symptoms of a system (Yolles 2007, 39ff). Fink & Holden 2008 used this approach to describe the collective culture shock caused by expatriates on an affiliate. An expatriate can change the phenomenal domain, as well as bring in a break of the autogenesis and autopoieses process, to which the local systems reacts with a shock. A similar effect could occur when a repatriate comes back to headquarters and tries to bring new cultural views into the receiving location. In both cases, the knowledge transfer is blocked until there is an adaption of either the system or the expatriate to the new environment.

METHODOLOGY

The purpose of this paper is to address the potential benefits of the use of repatriate employees to enhance organisational knowledge value chain. With this intent, we conducted an interpretive literature review and exploratory research focusing mainly on the relationship between the use of repatriate employee's knowledge and the enhancement of organizational knowledgebase. Repatriates have up to now often been the forgotten employees for many companies. This problem does not only hold true for businesses, but is also reflected in research. The specific area of combining repatriate management with knowledge management is even more under researched. We concentrated our analysis on repatriates as a resource of knowledge and its reflections on value chain.

MAJOR RESULTS

- Knowledge transfer is characterized by transferring both explicit knowledge - referring to technical aspects - and tacit knowledge -referring to more complex and deeper embedded knowledge (Kostova, 1999). Repatriates often possess large amount of tacit knowledge, which is extremely important for global corporations.
- Repatriates often acquire different types of knowledge that have the potential of being converted to organization learning and value.
- Knowledge sharing will only occur when repatriates feel valued by the organization and are seen by others as valuable reservoirs of knowledge; such recognition will allow repatriates to be more willing to share their knowledge and will allow other members of the organization to be more open to absorb such knowledge.

CONCLUSION

Organizations that operate in the international market cannot shy away from adopting policies and practices to harness repatriate's knowledge. The combination of repatriates and knowledge management has had very little research so far. This paper thus highlights the clear need to further expand on the area of repatriate knowledge management and suggests that structures and processes need to be in place in order to allow the repatriate's knowledge and expertise to be shared with other and become embedded in the organization. It is the knowledge possessed by these key individuals that is the main asset for corporations to compete in the global market.

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SELECTION OF SPOILAGE PREVENTION STRATEGIES IN SUPPLY CHAINS USING QUEUING-THEORETIC APPROACH

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Abstract
The development of long queues is not uncommon in many supply chain situations. The prevalence of long queues decreases the efficiency of supply chain framework. During congestion situations in the supply chains of perishable items like vegetables, fruits etc., the items become useless if they are not supplied to the retailers (customers) at proper time. This may lead to significant loss to the supplier firm. The perishable items can be modelled by the reneged customers in the queuing modelling. In this paper, it is envisaged that if the supply firms incorporate strategies to prevent the spoilage of perishable goods during queuing, they can manage to earn significant revenues. If they employ such strategies in their supply chain queues, then there are chances that a certain percentage of perishable items can be prevented from being spoiled. Thus, there is a probability that a perishable item can be made to stay fit for its further use. This situation is analogous to the retention of reneged customers in queuing theory. We propose a single server, finite capacity, Markovian queuing model with retention of reneged customers to model this situation at one supply chain node. The steady-state (long-run) behaviour of the model is studied. The cost-profit analysis of the model is also carried out. The model results may guide a supply chain firm to choose a better spoilage prevention strategy from among many by knowing the cost-profit aspects associated with them.
Key Words: Supply Chains, Queuing, Spoilage Prevention Strategy, Reneging, Cost-Profit Analysis

JEL Classification C44, D22

INTRODUCTION

Supply chain management is the backbone of any business. The development of long queues is not uncommon in many supply chain management situations. The prevalence of queues at the supply chain nodes delays the delivery of goods and creates chaotic situations at the customer end. In the supply chains of perishable items like vegetables, fruits etc. the items become worthless if they are not supplied to the retailers (customers) at proper time. This may lead to significant loss to the supplier firm. The effective queuing analysis and selection of appropriate queuing models can help at this juncture, as they help in the quantitative analysis of delay faced by the items.

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The perishable items can be modelled by the reneged customers in the queuing modelling. It is envisaged in this paper that if the supply firms incorporate strategies to prevent the spoilage of perishable goods during queuing, they can manage to earn significant revenues. If they employ the spoilage prevention strategies in their supply chain queues, then there are chances that a certain percentage of perishable goods can be prevented from being spoiled. Thus, there is a probability that a perishable item can be made to stay fit for its further use. This situation is analogous to the retention of reneged customers in queuing theory.

For example, in vegetable supply chains, the vegetables are produced by the farmers and then taken to the nearest Sabzi Mandi for sale. In Sabzi Mandi, the farmers supply their produce (vegetables) to the commission agent after some sort of registration process. In this way, the vegetable units join the storage area (queue) of the agent. The capacity of the storage area of the commission agent is finite. So, some farmers may not register their vegetables with the agent due to capacity constraint, if the area is full. Such units are said to be lost from the system. The commission agent then sells the vegetables to the wholesalers or retailers. If the waiting time of items in the queue (in the storage area) is too large, some vegetable units may get spoiled due to temperature, moisture, pressure, low quality packaging etc. Such vegetable units are considered as reneged customers. Reneging leads to revenue loss to the commission agent as the perished vegetables can't be sold. But, if the commission agent utilizes certain spoilage prevention strategies such as better packaging, refrigeration, and preservatives etc., some percentage of perishable items can be prevented from being spoiled which can fetch him significant revenue. Such type of spoilage prevention is referred to as the retention of reneged customers in queuing terminology.

A single server, finite capacity, Markovian queuing model with retention of reneged customers is proposed to model this type of queuing situation at one supply chain node. The steady-state (long-run) behaviour of the model is studied. The cost-profit analysis of the model is also carried out.

Rest of the model is arranged as follows: review of literature is presented in section 2. Section 3 describes the basic model. In section 4, mathematical model is formulated and solved in steady-state. Section 5 deals with the cost-profit analysis of the model, and the paper is concluded in section 6.

LITERATURE REVIEW

The concept of queues with customer impatience (reneging and balking) has been exploited to a great extent in the past six decades. Such queues find their useful applications in various fields like computer-communication, supply chain management, inventory management, call centers, health care etc. A customer is said to be impatient if he tends to join the queue only when a short wait is expected and tends to remain in the line if his wait is sufficiently small. Impatience generally takes three forms. The first is balking, the reluctance of a customer to join a queue upon arrival; the second reneging, the reluctance to remain in line after joining and waiting; and the third jockeying between lines when each of a number of parallel lines has its own queue (Gross and Harris, 1985). The notion of customer impatience appears in the queuing theory in the ork of Haight

(1957). He considers a model of balking for M/M/1 queue in which there is a greatest queue length at which an arrival will not balk. This length is a random variable whose distribution is same for all customers. Haight (1959) studies a queue with reneging in which he studies the problem like how to make rational decision while waiting in the queue, the probable effect of this decision etc. Ancker and Gafarian (1963a) study M/M/1/N queuing system with balking and reneging and perform its steady state analysis. Ancker and Gafarian (1963b) also obtain results for a pure balking system (no reneging) by setting the reneging parameter equal to zero. Queuing theory has successfully been applied to various congestion (queuing) situations involving revenue generation through servicing customers. Aforementioned queuing systems deal with the customers' loss due to impatience (balking or reneging) which results into a substantial reduction in the total revenue. None of the above-mentioned papers studies the retention aspects of the impatient customers. Recently, Kumar and Sharma (2012) focus on the retention of impatient (reneged) customers and study an M/M/1/N queuing system with reneging and retention of reneged customers. They obtain the steady-state performance of the system and performance the sensitivity analysis.

The following paragraphs describe the application of queuing theory in the modelling of supply chains. Viswanatham and Srinivasa Raghavan (2001) apply queuing networks for the performance modelling of the supply chains. They present analytical models for evaluating the average lead times of make-to-order supply chains. They illustrate the use of fork-join queuing networks to compute the mean and variance of the lead time. Anderson and Morrice (2002) study a two-stage serial supply chain often found in service sector and make-to-order manufacturing industries having no finished goods inventory at either stage. The processing occurs only after an order is received and the backlogs are managed solely by adjusting capacity. They model this supply chain using a tandem queuing model. They study the impact of changes in first stage lead-time and capacity adjustment time on backlog, waiting time, and capacity variances at both stages. Armbruster et al. (2006) consider a supply chain consisting a sequence of buffer queues and processors with certain throughput times and capacities. They derive a hyperbolic conservation law for the part density and flux in the supply chain.

Saffari and Haji (2009) study a two-echelon supply chain consisting of a supplier and a retailer. The customers refer to retailer according to a Poisson process and retailer uses one for one inventory policy. Supplier follows continuous review (r, Q) policy. Satisfying each demand which arrives to the supplier needs an on hand-inventory and a process/service. During a period that supplier has non zero on-hand inventory, arriving demands from retailer join the queue. But when supplier has no on-hand inventory retailer buys product from the other source with zero lead time and additional cost. They calculate long-term performance measures of the systems that are used to minimize the supply chain costs. Hajfathailiha et al. (2011) use an M/M/1/N queuing system with customer impatience for locating the order penetration point in a two-echelon supply chain with customer loss. They perform the cost-profit analysis of the model.

Teimoury et al. (2011a) formulate a queuing inventory model for multi-product supply chains. They model the supply chain situations by GI/G/1 (the input and output distributions general) queuing model and perform the cost analysis. Teimoury et al. (2011b) apply the fuzzy queuing methodology for optimizing a multi-supplier supply chain framework. In this paper, they study the splitting of orders among suppliers with

different lead times for minimizing the shortage cost. They consider this policy for the inventory system and use fuzzy queuing methodology for analyzing the performance of the system. They apply the model for the case study (SAPCO), and find that order splitting in optimized condition results in the least supply risk and minimized shortage cost in comparison to other cases.

The above-mentioned papers deal with the application of queuing models in supply chain situations. None of them deals with the prevention of spoilage due to the perishable items, and the associated spoilage prevention strategies. In this paper, we propose a queuing model for modelling a supply chain node with a queue of perishable items, and the spoilage prevention. The analysis of different spoilage prevention strategies is also carried out.

BASIC MODEL

The units joining a queue at a supply chain node arrive in a Poisson stream with an average arrival rate λ. The units are served one by one by a single server, and the service times are exponentially distributed with parameter μ. The units are served in the order of their arrival (i.e. the queue discipline is first-come, first-served, FCFS). The capacity of the system is taken as finite say; N (i.e. the system can accommodate at the most N units). Each unit upon arriving at a supply chain node will wait a certain length of time (reneging time) for its service to begin. If it does not begin by then, it may get perished (reneged) and may become worthless (customer may leave the queue without getting service) with probability 'p' , and may remain fit for its further use (remain in the queue for his service) with probability q = (1-p), if certain spoilage prevention strategy (customer retention strategy) is employed. The reneging times follow exponential distribution with parameter ξ .

MATHEMATICAL FORMULATION OF THE MODEL AND SOLUTION

Define,

$P_n(t)$ = the probability that there are n units in the system.

The differential-difference equations of the model are:

$$\frac{dP_0(t)}{dt} = -\lambda P_0(t) + \mu P_1(t)$$

… (1)

$$\frac{dP_n(t)}{dt} = -[\lambda + \mu + (n-1)\xi p]P_n(t) + (\mu + n\xi p)P_{n+1}(t) + \lambda P_{n-1}(t) \; ; 1 \le n \le N-1$$

… (2)

$$\frac{dP_N(t)}{dt} = \lambda P_{N-1}(t) - [\mu + (N-1)\xi p]P_N(t) \; ; n = N$$

… (3)

In steady state, $\lim_{t\to\infty} P_n(t) = P_n$ and therefore, $\frac{dP_n(t)}{dt} = 0$ as $t \longrightarrow \infty$.

Thus, the steady-state equations corresponding to equations (1) - (3) are as follows:

$$0 = -\lambda P_0 + \mu P_1$$

… (4)

$$0 = -[\lambda + \mu + (n-1)\xi p]P_n + (\mu + n\xi p)P_{n+1} + \lambda P_{n-1}$$

… (5)

$$0 = \lambda P_{N-1} - [\mu + (N-1)\xi p] P_N$$
… (6)

Solving recursively equations (4) – (6), we get

$$P_n = \prod_{k=1}^{n} \frac{\lambda}{\mu+(k-1)\xi p} P_0 \; ; 1 \le n \le N-1$$
… (7)

P_n is the steady-state (long-run) probability that there are n units in the system (i. e. at any supply chain node).

Also for $n = N$ we get

$$P_N = \prod_{k=1}^{N} \frac{\lambda}{\mu+(k-1)\xi p} P_0$$
… (8)

Using the normalization condition, $\sum_{n=0}^{N} P_n = 1$, we get

$$P_0 = \frac{1}{\left(1+\sum_{n=1}^{N}\prod_{k=1}^{n}\frac{\lambda}{\mu+(k-1)\xi p}\right)}$$
… (9)

EXPECTED NUMBER OF UNITS IN THE SYSTEM (SUPPLY CHAIN NODE), LS:

$$L_s = \sum_{n=0}^{N} n P_n$$
$$L_s = \sum_{n=1}^{N} n \left(\prod_{k=1}^{n} \frac{\lambda}{\mu+(k-1)\xi p}\right) P_0$$

Where P_0 is given in (9).

COST-PROFIT ANALYSIS OF THE MODEL

This section provides the cost-profit analysis of the model by studying the total expected cost, total expected revenue and total expected profit of the queuing system. The different parameters involved are:

$\frac{1}{\lambda}$ = mean inter arrival time.

$\frac{1}{\mu}$ = mean service time.

λ_{lost} = rate at which a unit is lost due to capacity constraint.

P_N = probability that the system is full.

L_s = expected number of units in the system.

R_r = average rate of reneging .

R_R = average rate of Retention.

TEC = total expected cost.

C_s = cost per service per unit time.

C_h = holding cost per unit per unit time.

C_l = cost associated to each lost unit per unit time.

C_r = cost associated to each perished unit per unit time.

C_R =

per unit cost associated with a particular spoilage prevention strategy per unit time.

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R = earned revenue per unit by providing service to each unit per unit time.

TER = total expected revenue of the system.

TEP = total expected profit of the system.

For a finite capacity-system some units cannot join the system when they find that the system is full, then immediately they go elsewhere and are said to be lost from the system with rate λ_{lost} which is expressed as λ_{lost} = number of lost units per unit time. This implies that $\lambda_{lost} = \lambda P_N$.

We obtain the average reneging rate R_r and the average retention rate R_R as follows:

$$R_r = \sum_{n=1}^{N} (n-1)\xi p P_n \text{ and } R_R = \sum_{n=1}^{N} (n-1)\xi q P_n$$

We define the total expected cost (TEC) of the system as

$$TEC = C_s \mu + C_h L_s + C_l \lambda P_N + C_r R_r + C_R R_R$$

Let R be the earned revenue for providing service to each unit (item) per unit time then RL_s is the total earned revenue for providing service to average number of units in the system, L_s. $R\lambda P_N$ and RR_r are the losses in the revenue of the system due to number of lost units per unit time due to capacity constraint and due to spoilage (reneging of customers) respectively. Hence, total expected revenue (TER) of the system is given by

$$TER = RL_s - R\lambda P_N - RR_r$$

Now, total expected profit (TEP) of the system is defined as:

$$TEP = TER - TEC$$

Thus, $$TEP = (R - C_h)L_s - (R + C_l)\lambda P_N - (R + C_r)R_r - \mu C_s - C_R R_R$$

For given values of different parameters, the numerical results are computed using MS-Excel. Numerically, the impact of different spoilage prevention strategies on the revenue earned (or profit obtained) can be compared from the table-1.

Table-1 shows the impact of different spoilage prevention strategies on the total expected profit of the system. The symbol S denotes a particular spoilage prevention strategy and C_R is the corresponding per unit cost. It can be observed from the table-1 that as the percentage of perishable items prevented from being spoiled (probability of customer retention) associated with a particular strategy increases, the total expected profit also increases. Here, S_0 denotes the case when there is no spoilage prevention and in this case the total expected profit is minimum (60.0512). In the case of S_{10}, 100 % of the perishable items is prevented from being spoiled. This case is analogous to the absence of spoilage at any supply chain node or in queuing terminology it refers to the absence of reneging. The total expected profit corresponding to S_{10} is maximum (75.2932).

Table 1

Impact of the spoilage prevention strategies on the total expected profit

When we take $\lambda = 3$, $\mu = 4$, $\xi = 0.15$, $N = 4$, $C_s = 5$, $C_h = 3$, $C_l = 12$, $C_r = 8$, and R=100.

Spoilage Prevention Strategy (S)	Percentage of perishable items prevented from being spoiled (q)	Cost per unit associated with a particular strategy (C_R)	Total expected Revenue (TER)	Total expected cost (TEC)	Total expected profit (TEP)
S_0	0	0	88.9786	28.9274	60.0512
S_1	10	6	91.3261	28.9677	62.3584
S_2	20	8	93.6924	29.0949	64.5975
S_3	30	12	96.0776	29.4391	66.6385
S_4	40	14	98.4818	29.7871	68.6947
S_5	50	20	100.905	30.6592	70.2461
S_6	60	25	103.348	31.6702	71.678
S_7	70	32	105.811	33.2151	72.5954
S_8	80	36	108.293	34.5546	73.738
S_9	90	40	110.794	36.0827	74.7117
S_{10}	100	45	113.316	38.023	75.2932

Thus, a supply chain firm can have a snapshot of the long-run behaviour of the system, the costs and profits associated with various spoilage prevention strategies (customer retention strategies) using this model. The firm can choose a cost-effective spoilage prevention strategy by adopting the above-mention analysis.

CONCLUSIONS

In this paper, a queuing theory approach is applied to study the spoilage prevention strategies in supply chains. The steady-state analysis of the queuing model under consideration is performed and the cost-profit analysis of the model is also done. Through the cost-profit analysis of the model one can study and compare the long run impact of different spoilage prevention strategies on the revenue generation/ profit of a supply chain firm.

This model is limited to a single node of supply chain. The study can be extended to consider two or more nodes (supply centres) in series. Further, the network of various supply chain nodes with prevention of perishablity can also be studied with the help of queueing networks with retention of reneged customers.

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STUDY OF ENVIRONMENTAL CHARACTERISTICS IMPACT ON SUPPLY CHAIN MANAGEMENT PRACTICES IN SMES

Gaurav Sehgal[*]

Abstract

Firms can no longer effectively compete in isolation of their suppliers and other entities in the supply chain. As organizations seek to develop partnerships and more effective information links with trading partners, internal processes become interlinked and span the traditional boundaries of firms. The SMEs' view of SCM seems to be the exertion of power by customers and consequently is seen by SMEs' as a one-way process. Similarly, SMEs' do not employ SCM; rather they are managed at arm's length by large customers. The choice of organization's environment is a driver to SME organization's growth. SMEs' grow by pursuing a differentiated strategy and progressing through discrete stages of growth and consequently the ability of the entrepreneur to make structural and strategic changes may determine the growth prospects of business. However, in SMEs' the choice of environment is constrained by the entrepreneur's past experience and does not appear to be an active decision variable. Superior competitive strategies are essential if the SME is to achieve not only absolute growth rates but also growth relative to competitors and the market. This paper is one of the first attempts to study the Supply Chain Practices of Small and Medium Enterprises. The objective of this paper is to find out the impact of environmental ambiguity on the Supply Chain Management Practices of the firm. The sample frame is SMEs of Jammu District in J&K State. Random samples of 323 respondents were selected from the said SMEs. The respondents were administered a structured questionnaire containing scales to measure the environmental uncertainty and supply chain management practices of firms. After the data were collected, the scales were purified using Corrected-Item-Total-Correlation (CITC) values and Cronbach's Alpha values (α). After purifying the items based on CITC, an Exploratory Factor Analysis (EFA) of the items in each construct was conducted for assessing construct dimensionality. The Kaiser-Meer-Olkin (KMO) measure of sampling adequacy was calculated for all dimension-level and construct-level factor analysis. Thereafter, unidimentionality of the underlying latent constructs was examined using CFA. Due to the robustness and flexibility of the Structural Equation Modeling (SEM) in establishing CFA, this paper uses SEM to test both first-order as well as second-order CFA models.

Keywords: SME, SCM, Superior competitive strategies

JEL Classification K32, Q50

INTRODUCTION

Supply Chain is the interrelated collection of processes and associated resources that starts with the acquirement of raw material and extends to the delivery of end items to the customer. It includes suppliers, manufacturers, logistics service providers, warehouses, distributors, wholesalers and all other entities that lead up to delivery to the final customer.

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In a wider perspective it may also include the suppliers to the vendors and the customers of the immediate customers. For typical marketing and sales operations the supply chain is more restricted and extends from purchasing the finished goods from the manufacturing facilities to supplying the immediate customer. In more advanced operations it may extend to the customer of the immediate customer. Now in this era of technology and competition the firms need to establish themselves as a strategic entity which is now a necessity. Successful Supply Chain Management (SCM) requires a fully integrative approach: employees, processes, technology, functions and even supply network partners need to be fully aligned and synchronized in order to build capability and thereby gain sustainable competitive advantage. Organizational approaches need to move to where there is north-south goal alignment but a focus on east-west process performance. This research paper tries to address these issues with concentrations on the Small and Medium Enterprises (SMEs).

REVIEW OF LITERATURE

Baratt (2004) defines supply chain as a network of facilities and distribution options that performs the functions of procurement of materials, transformations of these materials into intermediate and finished products and distribution of these finished products to the customers. Balsmeier and Voisin (1996) states that supply chains exist in both service and manufacturing organizations, although the complexity of the chain may vary greatly from industry to industry, and from firm to firm.
Organizational infrastructure constrains makes possible what the entities in an organization can accomplish. It defines the organization's management and philosophy regarding how the employees of the firm are organized into formal and informal teams of departments; how these teams interact formally and informally; and role and goals of each team and how these relate to the overall corporate strategy (Davenport and Prusak, 1998).
 Perceived benefits refer to the level of recognition of the relative advantage that SCM can provide to the organization. Many practitioners and researchers have attempted to identify the potential advantages that knowledge management system has to offer. Pfeiffer (1992) and Iacovou et al. (1995) argued that these perceived benefits can be understood from two perspectives. The first perspective looks at the direct benefits from SCM. These are mostly operational improvements in organizational knowledge management capabilities that the firm believes SCM can bring. The purpose of knowledge management system is to improve the knowledge management process (Alavi and Leidner, 2001). Therefore one's understanding to firm's perceived knowledge management capability improvement is based on the five activities of the generic knowledge management process identified by Cormican and O'Sullivan (2003), that is, firm's capabilities on supply chain knowledge generation, storage, access, dissemination and application are all expected to be facilitated by SCM practices. All of the expected benefits should be reflected as an outcome from SCM, providing the implementation is successful. Thus there are two general dimensions of impacts: the first is the improve knowledge capabilities as represented by high supply chain knowledge quality, and the second dimension is the organizational performance advancement, as reflected by supply chain integration as well as supply chain performance.

External influences refer to various external conditions and events that create opportunities and threats to the firm, and exert pressure to adopt and implement SCM. Follow the studies of Kaun and Chau (2001), Zhu et al (2003) and Nikolaeva (2006), one identifies three major external influence factors: (1) *Environmental characteristics,* which examine the organizational environment such as environmental uncertainty in business, perceived competitive pressure to implement SCM and trading partner readiness for SCM; (2) *Knowledge complementarity* studies how different each firm's knowledge bases are and how important a firm perceives other's knowledge to its own operations; and (3) *Trading partner relationship.* All these three dimensions of external influences have substantial impact on whether a particular firm is willing to implement SCM with its trading partners.

Supply chain performance is a construct with a set of performance measures to determine the efficiency and / or effectiveness of a system (Beamon, 1998). Different researchers have attempted to assess supply chain performance in different ways, but most measures available in the literature are largely economic performance oriented. Harland (1996) suggests that intangible aspects of performance such as customer satisfaction should also be assessed. Garwood (1999) cautions that new measurement angle must be used on besides the old yardsticks for supply chain performance such as purchase price variance, direct labor efficiency, equipment utilization, and production development budget are no longer adequate. A set of measures has been suggested and used in the literature to respond to the current requirements for a comprehensive supply chain performance measurement. Stevens (1990) suggested such items as inventory level, service level, throughput efficiency, supplier performance, and cost. Pittiglio et al. (1994) summarized four categories of measures, viz, customer satisfaction / quality, time, cost and assets. Spekman et al. (1998) suggested cost reduction and customer satisfaction. Narasimhan and Jayaram (1998) identified the customer responsiveness and manufacturing performance. Beamon (1998) recommend to use a bundle including several qualitative measures, namely, customer satisfaction, flexibility, information and material flow integration, effective risk management, and supplier performance.

RESEARCH METHODOLOGY

The environmental characteristics of any firm affect the ability of a firm to deliver promptly to its customers. It directly affects the ordering schedule of the firm, thus creating variations in purchases. This, in turn, adversely affects the integration of the firm with its suppliers.

Theoretical Framework

In the present research paper The Environmental Characteristics construct was presented with three sub-constructs, viz-a-viz, Environmental Uncertainty, Competitive Pressure and Trading Partners Readiness having five, four and five items respectively. Furthermore, the second construct, viz-a-viz, Supply Chain Management Practices was also a multi-dimensional construct with four sub-dimensions, viz, Supply Chain Performance (SCP) and Barrier Free Access (BFA) with five items each, Supply Chain Knowledge Dissemination (SCKD) with four items and Supply Chain Practices Application (SCPA) with six.

Hypothesis

Since the objective of this research paper was to study the impact of environmental characteristics on the supply chain management practices adopted by the firm especially SMEs, thus, the following hypothesis was framed:

H_1: *Environmental Characteristics of SMEs has a direct and positive relationship in improving supply chain management practices in the firm.*

Data Collection, Methodology and Instrument Administration

In order to collect precise data, a reliable measurement instrument is needed. To ensure brevity, understandability and content validity of the items, a rigorous validation procedure was adopted for preliminary test. A survey instrument in the form of a questionnaire was designed based on the constructs previously described and verified from the research methodology adopted for meeting the objectives stated for this research study. Responses of the respondents were marked using a five-point Likert scale, on four varied themes. In the first phase the questionnaires were sent to all 450 respondents inviting them to participate in the study with a brief description of the research, stating that all data collected would be used for academic research only and be handled confidentially. The sample area for the presented paper included industrial hubs of Jammu only. The industrial hubs / units located at Samba, Kathua, Vijaypur, Bari Brahmana & Gangyal were surveyed for the presented research paper.

Response Rate

The researcher received 261 non-deliverable / un-returned questionnaires in first phase of the survey. There were another 21 replies declining participation to the study due to the following reasons: (1) no longer in the supply chain/procurement area (2) company policy forbidding disclosure of information. Therefore, during the first phase of the research work, a total of 240 responses were collected. Thereafter in the second phase, the questionnaires were distributed after one month, and were circulated to those respondents who had not yet responded. The total responses received in this phase were 189 responses, out of which again a total of 18 responses were incomplete and thus were rejected while data entry was administered, thereby making a total of 171 responses. Therefore, the final number of complete and usable responses for the study stood at 411 (240 in first phase and 171 in the second phase). It yielded a response rate of 91.33%, indicating a reasonable and acceptable response rate for surveys (Dillman 2000). Furthermore, it was analysed that among 411 respondents 88 respondents were either not associated with Supply Chain Management Practices and / or were out of the scope of the questions supplied for the study. Henceforth, a total of 323 responses were finally administered for further statistical analysis, which yielded a response rate of 71.77%. (The statistical tables for the response rate have not been included in this research paper due to limitation of words).

Non-response Bias Assessment

Non-response bias could be one of the major concerns for survey research methodology. Because when non-response bias exists, the data collected might not be representative to

the population the researcher was intended to study. Thus statistical procedures must be taken to assessment the non response bias of the sample. For this estimation it was assumed that the second wave response is a non-response for the first wave. Chi-square tests were used to make the comparisons of all the 323 responses. It was found that no significant difference in Number of employees in the firm (NoE), Position of the firm in the supply chain (PoSC), Respondent's Job Title (ReJT), Respondents Job Function (ReJF) in the firm and Number of Years of Service (ReYoS) of the respondent in the firm (ReYoS). Thus the researcher concluded that non-response bias was not a cause for concern for this study. (The statistical tables for non-response bias have not been included in this research paper due to limitation of words).

Methodology

As suggested by Gerbing and Anderson (1988), the researcher decided to test the measurement model first to avoid possible interactions between the measurement and the structural models. Furthermore, a measure cannot be valid unless it is reliable, but a measure can be reliable without being valid. Bagozzi (1980) and Bagozzi & Philips (1982) suggested a instrument evaluation guideline that the instrument properties for reliability and validity include purification, factor structure (initial validity), unidimentionality, reliability and the validation of the second-order construct. The methods for each analysis were: Corrected-Item-to-Total-Correlation (for purification), Cronbach's Alpha (for reliability) and Confirmatory Factor Analysis (for first and second order factor structure and unidimensionality).

The measurement items (34 in total) were first purified by using Corrected-Item-to-Total-Correlation (CITC) scores with respect to a specific dimension of the construct. Following the guidelines constructed by Nunnally (1978). The reliability analysis of IBM® SPSS® 19.0 was used to perform CITC computation of each of the construct.

After purifying the items based on CITC, an Exploratory Factor Analysis (EFA) of the items in each construct was conducted for assessing construct dimensionality. IBM® SPSS® 19.0 was extensively used to explore potential latent sources of variance and covariance in the observed measurements. Principal Component Analysis (PCA) was used as factor extraction method and VARIMAX was selected as the factor rotation method. Also MEANSUB option was used in most cases to replace the missing values with the mean score for that item. All the items for each construct were EFA tested regardless for its existence in a proposed sub-dimension. To ensure high quality of instrument development process in the current study, 0.5 was used as the cut-off for factor loadings (Hair, et. al., 1992). The Kaiser-Meer-Olkin (KMO) measure of sampling adequacy was calculated for all dimension-level and construct-level factor analysis. This measure ensures that the effective sample size is adequate for the current factor analysis. The next step after item purification is to examine the unidimentionality of the underlying latent constructs. CFA is used to determine the adequacy of the measurement model's goodness-of-fit to the sample data. Due to the robustness and flexibility of the Structural Equation Modeling (SEM) in establishing CFA, this research uses SEM to test both first-order as well as second-order CFA models. Model data fitting was evaluated based on multiple goodness-of-fit indexes. Goodness-of-fit measures the correspondence of the actual or observed input (covariance or correlation) matrix with that predicted from the

proposed model. For this study the researcher has used reports of several measures of overall model fit from IBM® SPSS® AMOS™ 19.0, such as, Goodness-of-fit-index (GFI), Adjusted-goodness-of-fit-index (AGFI), Comparative-fit-index (CFI), Normed-fit-index (NFI), Root-mean-square-residual (RMR) and Root-mean-square-error-of-approximation (RMSEA). Finally, the reliability of the entire set of items comprising the second order constructs was estimated using Cronbach's alpha. Following the guideline established by Nunnally (1978).

RESEARCH FINDINGS AND DISCUSSIONS

Measurement Results
 Environmental Characteristics

Environmental Characteristics (EC) is a multiple dimension construct measured having a total of 3 sub-constructs and a total of 14 items (with 5 items in Environmental Uncertainty (EU), 4 items in Competitive Pressure (CP) and 5 items in Trading Partners Readiness (TP)).
CITC scores indicated that the Cronbach's Alpha for EC equaled 0.854 (with EU=0.882; CP=0.821 & TP=0.830), which was acceptable for the study, but CITC for separate dimensional constructs revealed that CITC score for CP1 (0.492) and TP1 (0.486) were below the CITC cut off value of 0.5; but due to the importance of the item TP1 was retained at a low CITC score and thus we decide to remove only CP1 from further analysis. The second itinerary of reliability analysis after deleting CP1 all the left over items under CP dimension showed Cronbach's Alpha values above 0.5; also the overall Cronbach's Alpha value for the EC construct was 0.848 which is acceptable for our study.
An Exploratory Factor Analysis (EFA) was then conducted using principal components as means of extraction and VARIMAX as method of rotation. The Kaiser-Meyer-Olkin (KMO) score of 0.877 indicated an acceptable sampling adequacy. As expected the analysis resulted into extraction of three components with the cumulative variance explained by the three factors as 69.876%. All the factors that emerged from the factor analysis were with factor loadings above 0.50.
The first order CFA model for EC was then tested using IBM® SPSS® AMOS™ 19.0 with the statistics as presented in Table-1. The results indicated that although factor loading coefficients for the initial model were greater than 0.60, except for EU5 (0.59), the model fit showed a poor indices: χ^2/df= 3.490; RMSEA= 0.088 ; RMR= 0.055 ; GFI= 0.901; AGFI= 0.854; NFI= 0.906 and CFI= 0.930. Henceforth, modification indices were utilized for modifications in the model which indicated a chance for model improvement as a result from possibility of error correlation (as shown in Table-1); by removing the correlated affects the final first-order CFA model was thus obtained. Thereafter, modification indices indicated that there was no need for any modifications in the model constructs. Table-1 below shows the model fit values for the First order CFA of Environmental Characteristics.

Table – 1
First Order CFA model fit results for Environmental Characteristics

Model Fit	χ^2	df	χ^2/df	RMSEA	RMR	GFI	AGFI	NFI	CFI
Initial	216.374	62	3.490	0.088	0.055	0.901	0.854	0.906	0.930
After Removing TP1	120.384	51	2.360	0.065	0.046	0.941	0.910	0.942	0.965

In the next step, the second order model was tested to see if these three sub-constructs (EU, CP & TP) underlie a single high order construct of EC. It was observed that high-order correlated effect was observed for EU1, TP2 and TP5; hence these items were deleted iteratively from the study model. Thereafter no further modification in the model was desired. The resultant goodness-of-fit indices for the second-order construct are as illustrated in Table-2.

Table – 2
Second Order CFA model fit results for Environmental Characteristics

Model Fit	χ^2	df	χ^2/df	RMSEA	RMR	GFI	AGFI	NFI	CFI
Initial	192.157	53	3.626	0.090	0.235	0.909	0.866	0.907	0.930
After Removing EU1	145.062	43	3.374	0.086	0.215	0.924	0.883	0.914	0.937
After Removing EU1, TP2	114.187	34	3.358	0.086	0.196	0.932	0.890	0.921	0.943
After Removing EU1, TP2, TP5	76.135	26	2.928	0.080	0.066	0.941	0.897	0.929	0.949

Supply chain Management Practices

Supply Chain Management Practices (SCMP) has 20 items in 4 sub-dimensions: Supply Chain Performance (SCP) five items, Barrier Free Access (BFA) five items, Supply Chain Knowledge Dissemination (SCKD) four items and Supply Chain Practices Application (SCPA) six items.
The CITC analysis revealed that it had a perfect Cronbach's α value (0.900). Furthermore, separate CITC analysis revealed that no item in each of the sub-constructs were below the CITC cut-off of 0.5.
In the next step EFA was performed using principal component as means of extraction and VARIMAX as method of rotation. The KMO score of 0.884 indicated a good sampling adequacy. All items load on their respective factors and the result showed no cross-loadings.
The first order CFA model for EC was then tested using IBM® SPSS® AMOS™ 19.0 with the statistics as presented in Table-III. The results indicated that although factor loading coefficients for the initial model were greater than 0.60 with the least at 0.67 for item SCPA4, but the model fit was having poor indices: χ^2/df= 7.846; RMSEA= 0.146 ;

RMR= 0.081 ; GFI= 0.729; AGFI= 0.653; NFI= 0.804 and CFI= 0.824 ; henceforth modification indices were utilized for modifications in the model which indicated a chance for model improvement as a result from possibility of error correlation (as shown in Table-3); after removing the correlated affects the final first-order CFA model was thus obtained. Thereafter, modification indices indicated that there was no need for any modifications in the model constructs. Clearly, the factor loadings (λ) were acceptable with the lowest being 0.73 for the item SSP1.

Table – 3
First Order CFA model fit results for Supply Chain Management Practices

Model Fit	χ^2	df	χ^2/df	RMSEA	RMR	GFI	AGFI	NFI	CFI
Initial	1286.779	164	7.846	0.146	0.081	0.729	0.653	0.804	0.824
After Removing BFA1	877.013	146	6.007	0.125	0.073	0.771	0.703	0.852	0.873
After Removing BFA1, BFA3	640.790	129	4.967	0.111	0.070	0.815	0.754	0.875	0.897
After Removing BFA1, BFA3, BFA2	455.053	113	4.027	0.097	0.070	0.846	0.791	0.899	0.921
After Removing BFA1, BFA3, BFA2, SCPA6	304.717	98	3.109	0.081	0.062	0.897	0.857	0.925	0.947
After Removing BFA1, BFA3, BFA2, SCPA4	198.817	84	2.367	0.065	0.056	0.926	0.894	0.947	0.969
After Removing BFA1, BFA3, BFA2, SCPA1	148.053	71	2.085	0.058	0.045	0.942	0.914	0.958	0.978

In the next step, the second order model was tested to see if these four sub-constructs (SSP, BFA, SCKD & SCPA) underlie a single high order construct of SCMP. It was observed that high-order correlated effect was observed for SSP1; hence this item of the sub-construct was deleted from the study model. Thereafter no further modification in the model was desired. The resultant goodness-of-fit indices for the second-order construct are as illustrated in Table-4.

Table – 4
Second Order CFA model fit results for Supply Chain Management Practices

Model Fit	χ^2	df	χ^2/df	RMSEA	RMR	GFI	AGFI	NFI	CFI
Initial	360.737	76	4.747	0.108	0.291	0.851	0.794	0.899	0.918
After Removing SSP1	199.959	74	2.702	0.065	0.044	0.865	0.809	0.910	0.927

Structural Model for Hypothesis

For the structural model for hypothesis H_1, the constructs Environmental Characteristics (EnvCond (EC)) has been regarded as Independent Variables (Exogenous); whereas Supply Chain Management Practices Implementation (SCMP) has been regarded as Dependent Variable (Endogenous).
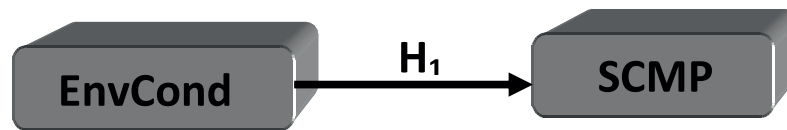

Figure – 1: Structural Model for proposed Hypotheses

The model was tested using one-tail test, a t-value greater than 2.33 is significant at the level of 0.01; and a t-value greater than 1.65 is significant at 0.05; and a t-value of 1.28 is significant at the level of 0.10. The t-value is calculated from the estimates of the model, where t-value is given as model path estimate (parameter) divided by the standard error. The results for the proposed hypotheses and propositions are as given in Table-5.

Table – 5
Structural model Hypothesis Testing Results

Hypot heses	Relationship	Standardize d Estimate	t-value	p-value	Significance (Yes/No)
H_5	EnvCond (EC) → SCMP	0.31	= (0.289/0.074) = 3.905	< 0.05	YES

The structural model for the proposed hypothesis is as presented in Annexure-I.

CONCLUSION

This relationship is found to be significant with a relationship of 0.31 and with t-value = 3.905). But the strength in the model is quite less from that of the rest of the propositions stated in the study. The result empirically confirms the proposal that not all SMEs meet the pre-requisite of SCM implementation when compared to LEs. Contextual factors do act as drivers to initiate organizations' commitment towards implementation of Supply Chain Management Practices (SCMP). Considering the large investment and efforts required in implementing SCM, the practical implication that SMEs should carefully gauge their operating environment when planning SCM initiations. Decision makers (management) should analyze the level of environmental uncertainty the organization is facing. If the uncertainty level is high in their operation, it is worthwhile to embrace supply chain management practices in the firm and strengthen firms adaptability to external changes. Organizations should also conduct thorough analysis to competitors in its industry. SCM is a long term initiation that would bring sustainable competitive advantages to the organization that is not easily copied by others. If adoption of SCM practices has become an industry-wide standard practice, the SMEs are likely to lose the competition if they do not have it on board. Similarly, a clear understanding to ones

trading partners is also essential in SCM implementation, because it is a wide attempt and not a narrow opening. All involved towards the functioning of the firm must be interested in and be ready for SCM implementation whole-heartedly, otherwise the system will not function to its fullest advantage. As argued by Jimmy and Lam (2006), different types of supply chains should take different approaches in managing organizational performance. An efficient supply chain operates in a relatively stable environment, though as today the responsive supply chains in SMEs are facing considerable amount of environmental uncertainty, but they need to be very willing to pursue any possible methods to overcome these hurdles and come up to the standards as per the situation. It is naturally that the level of environmental characteristics is a major driver for implementation of SCM in SMEs.

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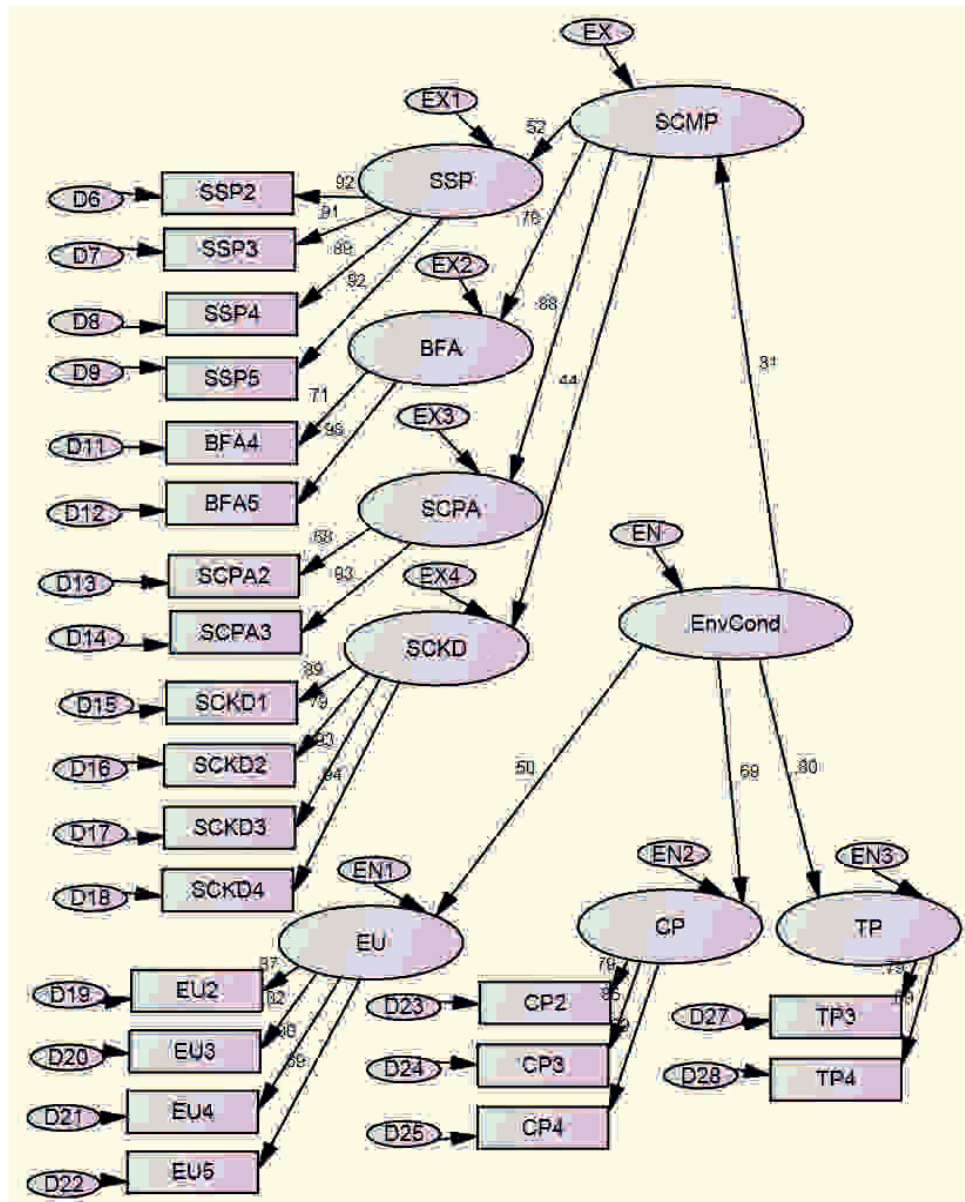
ANNEXURE-I

Figure II– Structural Model for testing of Hypothesis (H₁)

VALUE CHAIN ANALYSIS OF POULTRY FARMING IN JAMMU REGION- AN EMPIRICAL STUDY

Meenakshi Gupta* & Syeda Shazia Bhukhari**

Abstract
The aim of the present study is to evaluate the margins of different agencies involved in the production and marketing of poultry in Jammu region. It was discernible from the study that the marketing chain primarily consisted of hatcheries, poultry farmers and retailers. The under-privileged livestock producers face a number of constraints. Their access to modern services, marketing support, credit support etc is not easily available to the small holders. In this paper a primary data was collected from 5 hatcheries, 60 poultry farmers, 60 retailers and 100 consumers in the Jammu region. The results indicate that the net margin of hatcheries and poultry farmers was 2.5 each which was nominal as compared to retailers(net margin:5)
Keywords: Poultry; Intermediaries; Marketing Margins

JEL Classification D22, D24

INTRODUCTION

Livestock sector plays a crucial role in Indian rural economy and livelihood. According to the 17th live stock census of 2003[1] the country had 485 million livestock population and 489 million poultry population, being the first in cattle and buffalo population, second in respect of goat and third in respect of sheep population in the world. India has 57% of the world's buffalo and 16% of the world's cattle population. Indian Meat Sector with such immense raw material base has not been able to position itself as a major player in global trade for a variety of reasons including lack of appropriate support infrastructure for processing, non-adherence to the mandatory food safety norms and regional preferences due to religious issues, vegetarianism.

The livestock rearing in India is highly segmented. A vast majority of livestock producers come from under-privileged section of rural community which represents a sizeable population of rural families and contributes substantial livestock produce. Livestock are important in their livelihood culture and they have limited alternative opportunities for employment. On the other hand, the resource-rich section of the rural population also exploits livestock for optimizing their wealth. The under-privileged livestock producers face a number of constraints. The access to modern livestock services, marketing support, credit support for purchase of animals and its maintenance is not easily available to the small holders. Goat, pigs and backyard poultry are most commonly kept by the underprivileged and these get very little development or research support.

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Poultry has a significant role in India as the eggs and chicken meat are important and rich sources of protein, vitamins and minerals. Further, it provides rich organic manure and is an important source of income and employment to millions of farmers and other persons engaged in allied activities in the poultry industry. Chicken is the most widely accepted meat in India. The prices of chicken meat are lower than those of mutton or goat meat. In the last two to three decades, poultry has made tremendous strides particularly in the private sector, with the result that India is now self-sufficient with regard to requirements of high quality breeding stocks, modern poultry equipment, availability of medicines and vaccines and technically qualified skilled manpower. However the same is not true for the State of Jammu and Kashmir. Despite of one of the high rate of consumption of the livestock and poultry products the industry does not exhibit the growth. *"As part of the food habit, per capita consumption of meat and poultry items and milk is higher in Jammu and Kashmir State than that of all India level. The State is deficient in meat, poultry meat, eggs and milk thus making State heavily rely on imports from the other States"* (Economic Survey 2008-09, Govt. of Jammu & Kashmir). Over the period from 2006-07 and 2007-08 the total eggs' production increased by 6.45 percent but per capita eggs' productions decreased by 3.51 percent. Also it witnessed the 20.20 percent decrease in the sales of eggs in the state. One may trace the reasons in the complete operations of this industry in the state.

In poultry farming both intensive and traditional systems are followed, but intensive system is rapidly increasing due to increasing land and other input costs. The establishment of a commercial poultry farm requires a large capital investment for land, buildings, cages, feed handling and storage equipment. Also feed to the chicks, labour, veterinary and medication costs and the cost of the day old chick are other major expenses once an operation begins till production. Meat producing birds are marketed before they reach breeding maturity. Amongst these 'Broiler' is the term given to birds marketed when they are 6 weeks of age or weigh approximately 2 kilograms. Despite of all the efforts, poultry has still remained neglected and is at side-line of agricultural industry. Productivity of local birds' term of egg and meat (return) has been very low hence it is not consider as a paying enterprise. However the poultry raisers often whimper for low economic return for their poultry products and consumers in streets whinge for high cost of poultry products that is mainly due to high marketing margins of intermediaries in this industry. The producer is not rewarded by proper returns on his investment. In all stages of development there is a need to enhance the production efficiency and lowering the cost of distribution in existing marketing system. For the achievement of this goal the important steps are needed, such as orderly and least expensive marketing. Thus it is necessary to enable the producer to sell their produce at reasonable prices and consumer to buy their needs at minimum cost.

The present study was planned to conduct detailed investigation into the poultry (broiler) marketing channels prevalent in the present setup with a view to see their efficiency and margins. Therefore, this study is conducted with the following objectives:

1. To analyse the existing production and supply chain network of poultry in Jammu Region

    2. To estimate the cost and margin of different market intermediaries in Jammu Region
    3. To identify the different constraints faced by poultry producers and other market intermediaries in Jammu region.
    4. Suggest the remedial measures to improve the existing marketing system in Jammu Region

RESEARCH METHODOLOGY

Sample plan

This study is based on primary data from poultry farmers. The aim of this study is to assess the existing production and marketing system of poultry in Jammu region. The sampling frame for poultry producers consists of a list that defines the allocation of poultry farms and their vicinity; name of poultry producers and size of poultry farm was prepared during the informal survey. This list was utilized to determine the sample size. 5 hatcheries, 60 poultry farmers, 60 Retailers and 100 Consumers were interviewed for the study. The sample size was considered adequate in terms of depth and accuracy required and in terms of the time and resources available for the research study since the study was conducted in the of two months.

Analytical framework

The objectives of the present study were achieved by various analytical tools. The details are discussed below:

Marketing Margin Analysis

Marketing Margin analysis is the differences between prices at two market levels. Marketing Margins have been calculated through computing the absolute margin or price spread, which is essentially the same as the difference between the prices, paid and received by each specific marketing agency. The following formula was used to compute percentage-marketing margins as earned by each market intermediary in the marketing of broiler products.

$$Mm = (Ps \times 100) / Sp$$

Where, 'Mm' indicates the marketing margin earned by a specific agency,
'Ps' stands for price spread availed by that agency while '
Sp' represents sale price of the same agency for the same commodity.
Price spread (Ps) can be calculated as Ps = Sale Price of the commodity - Purchase Price of the commodity

Absolute Margin

Absolute margin is the difference between sale prices of two or more than two agencies for equivalent quantity of a specific commodity. Farm retail price spread or absolute

margin refers to the difference between the retail price and the price received by the farmers for an equivalent quantity of farm products.

Breakdown of Consumer's Rupee Breakdown of consumer's rupee is a phrase applied to the manner in which a consumer's one rupee expenditure on a particular commodity is divided among the producer and marketing agencies. It shows that portion of a consumer's rupee, which goes to the producer and which is earned by various marketing agencies such as collection agent and retailers. This was calculated by expressing the net margin of a specific agency as proportion of the retail price.

The following formula was used to determine the breakdown of consumer's rupee.

$$Bdcr = Ps / Rp$$

Where 'Bdcr' stands for breakdown of consumers rupee spent on specific commodity, 'Ps' indicates rupee spent on specific commodity, 'Ps' indicates price spread and 'Rp' represents retail price.

Marketing Costs

The marketing margin indicates the amount received by the different marketing agencies for providing their services. The next stage of the analysis is to determine whether these Margins are realistic in relation to their services provided.

Therefore, it is essential to calculate the 'costs' of these agencies. Marketing costs are the expenditure incurred by various market intermediaries from the time when commodity leaves the farm until it reaches the consumers. Such marketing costs indicate the actual expenses of a marketing agency including fixed and variable costs. These costs were incurred by the producers and other marketing intermediaries and have impact on prices as well as on the margins of the market intermediaries. The major cost components include loading, unloading, transportation and labour charges. These costs were computed on per kg basis. Each marketing agency was inquired about the amount it spent per kg and the cost of each agency was calculated by using the following formula.

$$MC = As/Qh$$

Where ' MC' stands for marketing cost of a specific unit quantity, 'As' for actual amount spent and 'Qh' represents quantity handled. All marketing costs were calculated in this manner.

Net Margin

The net margin of a specific agency is the net earnings, which it earns after paying all marketing costs. Net earnings of various market agencies involved in the marketing of poultry were computed with the following formula.

$$Nm = Ps - MC$$

Where 'Nm' stands for net margin, 'Ps' indicates the price spread availed by the specific agency and 'MC' represents marketing costs incurred by the same agency.

RESULTS AND DISCUSSION

Production

It was examined that in the study area there are mainly two types of breeds Cobb and Marshall. Poultry production varies from farm to farm; it ranged from 5-6 lakh kg /month and it depends upon the number of birds at that farm, rate of mortality in that flock, quality of feed and ratio of pure breed supplied. A lot of price variation was recorded in poultry market as well as in case of day old chick. The price of day old chick ranged from Rs.10/kg to Rs.15/kg. Due to decrease in demand of day old chick the prices become lower. Likewise the prices of poultry were also varied from time to time. But there is no thumb rule for poultry prices. It was examined that the average sale price is Rs.85 / Kg. It was found that the price of the poultry was an indirect function of production in the study area as with the rise in production price declined and vice- versa.

Existing Marketing System/ Supply Chain Network/Marketing Chain

Hatcheries

In the study area it was investigated that five hatcheries namely, Kashmir Valley Hatchers Shastri Nagar ; Chick Mac breeders Gandhi Nagar; JK Hatchery Sangram pura, Stark Breeders Gandhinagar, Manhas Hatcheries Mishriwala who supply one day old chick to the poultry farmers of Jammu region on the basis of the advance bookings.

Poultry Farmer

In case of poultry, poultry farmers supply the birds from poultry farms to the retailers. They have contacts with retailers in all retail markets and they supply them according to their need, which they recorded them in advance. Majority of the poultry farms are located within the vicinity of Jammu city and from here poultry is supplied to remote areas.

Retailer:

Retailers purchase the poultry birds from the poultry farms almost on daily basis according to the demand of the local area. Retailers in remote areas are supplied poultry through distribution vans.

Consumer

Consumers of the poultry generally belonged to household category. Additionally bakers, restaurants and barbeque stall are also counted in buyer's list. Majority of the buyers purchased poultry from retailer but some big hotels and restaurants purchase directly from poultry farm.
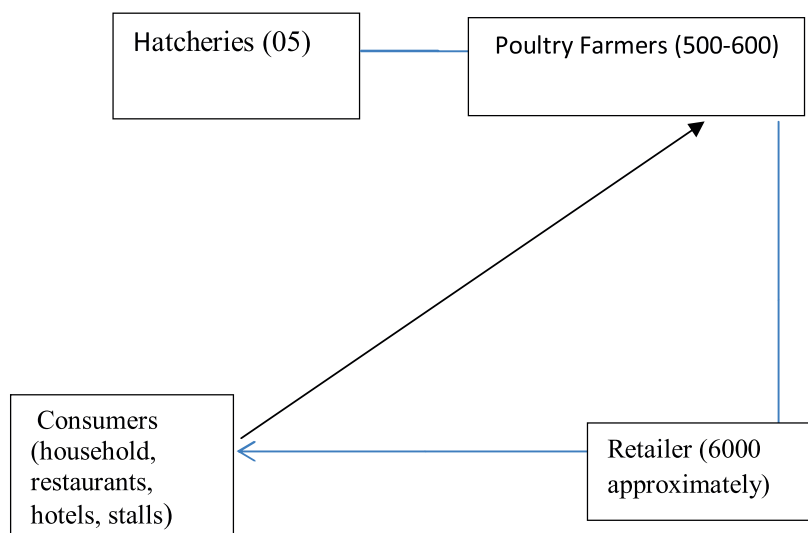
Fig.1 Framework of existing Market system of Poultry in J&K

Marketing Margin Analysis

In order to measure Marketing Margins, data on poultry prices were obtained at different stages in the marketing chain. Marketing Margins depend on the length of the marketing chain and the extent to which the produce is marketed. Marketing Margins can be computed in two ways: (a) absolute cash margins; and (b) percentage margins. The absolute cash margin is a good indicator of the trend of marketing costs (Thomas & Brennan, 1975). Both types of margin have been calculated to compare margins in absolute and proportionate terms in this section. It was investigated that marketing chain is not so longer, only a single intermediary is involved in poultry marketing in Jammu region and that is a retailer.

Poultry Prices

In the analysis of poultry prices there are some complications in formulating the standard price of poultry and the main problem is "day-to-day" variation in prices and price variations over the season. Such problems have been resolved by collecting prices, which may cover most of the above conditions. The price of poultry was collected on per kg basis. Information on the retail price of poultry was collected from the retailers of Jammu. Simple analysis of means poultry prices on per kg basis. It is obvious from results that producers face many financial problems due to price fluctuation and some time they face heavy losses. It is clear from data out of the supply chain that the poultry farmers paid Rs 12.5 for a chick to the hatchery and then sells complete chicken after developing it, at a sales price of Rs 85 while the sales price of the retailer to the consumer

is Rs. 120. Thus it can be concluded that retailers received highest prices from the consumers and hence the margins.

Table 1
Poultry sale price at different market levels of Poultry in J&K(Rs. / Kg)

Marketing agencies	Minimum price	Maximum Price	Mean
Hatchery	10	15	12.5
Poultry Farmer	80	90	85
Retailer	118	122	120

Source: Compiled from Primary Data Collected

The Absolute Cash Margin

The absolute cash margin of hatchery was calculated as the sale price of the poultry birds per kg paid by the poultry farmers. The absolute cash margin of poultry farmer & retailer is the sale price of Poultry in the market less the purchase price. Table 2 shows that retailer receive Rs.35/ kg that is the highest margin. It was also investigated that they bear very nominal marketing and handling cost and faced minor risks among other market agencies.

Table 2
Absolute Cash Margin at different market levels of poultry in J&K

Market Agencies	Average Absolute Margin
Hatchery	12.5
Poultry Farm	72.5
Retailer	35

Source: Compiled from Primary Data Collected

Share in Consumer's Rupee

The consumer's one rupee expenditure on a particular commodity is divided between the producer and other marketing agencies. The indicator shows that portion of a consumer's rupee which goes to the producer and that is earned by the various marketing agencies. The producer's share in consumer's rupee (on final retail price) was calculated on a per kilogram basis. Results indicated that retailer got 29 % share in consumer's rupee (Table 3).

Table 3
Percent Share in consumer's rupee at different market levels of poultry in J&K

Market Agencies	Share (%)
Hatchery	10
Poutry Farmer	61
Retailer	29
Consumer's Rupee	100

Source: Compiled from Primary Data Collected

Marketing Costs

The production costs of Hatchery is Rs 10/ kg that includes the cost of feed, labour wage, electricity etc. The cost of poultry producers were estimated to be Rs.70 per kg which includes price of day old chick, costs of feed, wood for heating, electricity, wage of employee, lime, and vaccination. It was also calculated that marketing cost incurred by retailer was Rs.30/ kg (Table 4). The marketing cost of retailer included the rent of shop, wage of labour (if any), electricity bill and cost of shopper bags. It is obvious from data that the costs incurred by the retailer are not so high and at the same time he enjoys a handsome margin

Table 4
Cost Incurred at different market levels(Rs./Kg)

Market Agencies	Cost
Hatchery	10
Poutry Farm	70
Retailer	30

Net and Percentage Margin

The net margin of a specific agency is the net earning, which it gains after paying all marketing costs. The net margin of the poultry producers was calculated on per kg basis as the sale price of the poultry birds less production costs of poultry producers. The net margins of collection agent and retailer were calculated as sale price of poultry in the market minus purchase price and other marketing costs. A further indicator calculated, is the percentage margin defined for each intermediary as the net margin divided by the absolute cash margin expressed as a percentage margin. The absolute cash margin has already been calculated by subtracting the price paid by a specific agency from the price received by the same agency. The estimated percentage margins of each marketing intermediary are presented in the following table.

Table 5
Net Margin & % Age Margin at different market levels (Rs./Kg)

Market Agencies	Net Margin	% Age Margin
Hatchery	2.5	20%
Poutry Farm	2.5	3.4%
Retailer	5	14.2%

Source: Compiled from Primary Data Collected

The perusal of table 6 reveals that the most important problem faced by the hatcheries were high cost of inputs and lack of Vertical Integration System with a mean score of 4.72 indicating that the non-existence of Vertical Integration System results in hike of input costs which further creates hindrance for sustainability of the hatchery. The other problems that hatcheries faced were shortage of funds (with a mean score of 4.23), long

electricity cuts (with a mean score of 4.01), shortage of skilled labour and lack of latest technology with a mean score of 3.28 each.

The poultry farmers reported that the most important hurdles faced by them were the lack of poultry disease diagnostic laboratories in the study area and deficiency of new technology in poultry housing i.e automatic feeding, watering etc (with a mean score of 4.89 each) due to which the poultry farmers of J&K lagged behind their counterparts within India and outside in terms of production. There were other problems also like high cost of feed due to importing of feed from other states etc.

As far as retailers are concerned, they were facing major problems like poor infrastructure facilities and also they were not able to control wastage due to poor preservation and meat processing facilities in the region.

Table 6
Problems faced by different intermediaries in Poultry in J&K

S. No	Nature of Problem	Mean score
Hatchery		
1	Shortage of Funds	4.23
2	Long electricity cuts	4.01
3	Shortage of Skillful Labour	3.28
4	Lack of vertical integration system	4.72
5	Lack of latest technology	3.28
6	High costs of inputs	4.72
Poultry Farms		
1	High cost of feed	4.23
2.	Lack of credit	2.78
3	Lack of Government Support	4.23
4	Lack of poultry disease diagnostic laboratories in the study area	4.89
5	Absence of training and education among poultry farmers	2.34
6	Deficiency of new technology in poultry housing i.e automatic feeding, watering etc	4.89
Retailer		
1.	Poor infrastructure facilities	4.27
2.	Lack of meat processing facilities	4.27
3.	Poor preservation and storage facility	3.84

Source: Compiled from Primary Data Collected

SUGGESTIONS

On the basis of this study a few suggestions are being proposed for the stakeholders in poultry like government, poultry farmers, retailers etc. like new technology in poultry housing should be introduced in J&K. Due to gap in the demand and supply, there should be backyard poultry in J&K so that the money is not lost to other states for imports. High

cost of feeds can be controlled by setting a local poultry feed manufacturing plants. For improving the health and controlling the disease, government should set up poultry disease diagnostic laboratories. To avoid wastage, poultry meat processing plants should be set up in the State at a large scale with some special incentives to such units. Vertical Integration Systems should be introduced in production, processing and marketing of poultry. Easy seed capital should be provided to small and marginal poultry farmers as well as backyard poultry farmers by all the banks and financial institutions.

MANAGERIAL IMPLICATIONS

1. This study is going to help young entrepreneurs especially women in starting local enterprises based on poultry.
2. Poultry meat processing plants if set up in this state would avoid wastage, and increase job opportunities and export opportunities for processed poultry products.
3. Vertical Integration System in production, processing and marketing of Poultry would reduce overhead costs and increase margins for all intermediaries.

CONCLUSION

Overall it can be concluded that poultry is a rewarding business for all the intermediaries involved in it, especially in J&K where there is huge demand for the product and prices are also rising day by day. However, a number of hurdles are also being faced by hatcheries, farmers and retailers as perishable product is involved which increases the risk. If these suggestions and policy options as suggested by the study are adopted, it would make J&K self-reliant as far as poultry is concerned. This would also be leading to overall socio-economic development and jobs for unemployed and disguised unemployed especially in rural areas. The paper also creates a case for introducing a Vertical Integration system in the poultry industry in J&K. This would not only help in regulating the cost of operations but also restrict the seasonal variability of prices in the supply chain of the poultry products. The state has domestic demand for the poultry products hence the well defined integration supported by government encouraging policies can provide good incentives for the growth of this declining Industry.

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BUYER- SELLER INTERACTION: A COLLABORATIVE APPROACH

Bimal Jaiswal[*]

Abstract

In this competitive market place, every participant, whether he is the buyer or the seller, struggles to survive and achieve better margins. To achieve this end and to improve product quality while simultaneously incurring lower costs, most market participants, buyers as well as sellers, have adopted several revolutionary strategies. Achievement of better margins through operational efficiency requires mutual co-operation between buyer and seller, which replaces the traditional mode of buyer-seller interaction, which often characterizes the two parties as adversaries. Thus, the more cautious arm's length relationships of the past are giving way to closer buyer seller co-operation, driven by the perception that there are greater benefits to be obtained through such partnerships.

The objective of the study was to use the interaction model to establish the new relationships between buyers and sellers. To achieve this, first a set of constructs were identified that signify the inter-relationship between buyers and sellers and then data was collected. Thereafter, statistical analysis of the data was done to establish the existence of the relationship, if any. Tests of reliability and validity were conducted to ensure that the data provided on adequate test of the theoretical propositions set forth in the study. Finally, the significance of each of the proposed relations was tested.

The results of the study indicate that the theoretical concepts being tested hold practical relevance as shown from the test data. The managerial implication of the study is that now and in the future, buyers and sellers will be compelled to survive and struggle through close co-operation in the competitive market, fraught with new entrants, market pressures, new technologies and other unending challenges.

Key Words: Interaction Model, buyer-seller relationship,

JEL Classification D40, D51

INTRODUCTION

In this competitive market place, every participant, whether he is the buyer or the seller, struggles to survive and achieve better margins. To achieve this end and to improve product quality while simultaneously incurring lower costs, most market participants, buyers as well as sellers, have adopted several revolutionary strategies. Achievement of better margins through operational efficiency requires mutual co-operation between buyer and seller, which replaces the traditional mode of buyer-seller interaction, which often characterizes the two parties as adversaries.

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Thus, the more cautious arm's length relationships of the past are giving way to closer buyer seller co-operation, driven by the perception that there are greater benefits to be obtained through such partnerships.

A number of studies have been conducted utilizing concepts and models that focus on close, interactive relationships between purchaser and supplier. The study proposes the interaction model that seems to be the best equipped to deal with the various issues pertaining to buyer seller relationships. The focus of the interaction model is on the factors which lead to close relationships between buyer and seller.

THE INTERACTION MODEL

The relationships among the interaction processes are indicated by the paths in figure.
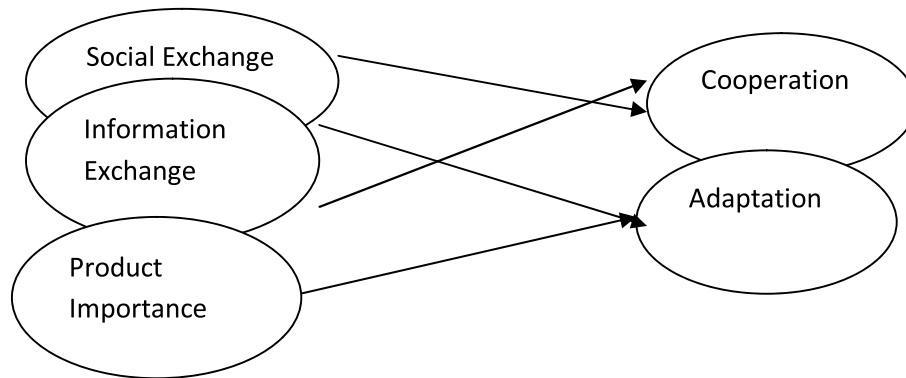
The theoretical basis for the model is discussed below

Information, social exchange and co-operation

- Co-operation is a product of the exchange episodes that take place between buyer and seller.
- Information exchange is related positively to the degree of co-operation in the relationship between buyer and seller.
- Social exchange is related positively to the degree of co-operation in the relationship between buyer and seller.

Co-operation and adaptation

- Co-operation is related positively to the willingness of buyers and sellers to make adaptations.

Information exchange and adaptation

- Information exchange is positively related to the willingness of buyer and sellers to make adaptation.

Product importance and adaptation

- Perceived product importance is positively related to the willingness of buyers and sellers to make adaptations.

OBJECTIVES OF THE STUDY

The main aims of the study are:
1. To identify various latent variables
2. To measure coefficient of correlation of correlation between the initial reliabilities of the items when items correlate and final reliabilities when items don't correlate.
3. To formulate hypothesis null(Ho) or alternative(Ha), setting standard reliabilities and then testing to measure significant difference between standard and sample reliabilities for different items.
4. To identify and discuss the managerial implications of the study.

LIMITATION OF THE STUDY

The study provides support for the relationship. It measures relationships of the various latent variables but besides these latent variables, we must take variables such as product complexity, perceived risk and perceived value and take these reliabilities for the items. Furthermore, although the reliabilities for all the variables are sufficient for this type of research uniformly higher reliabilities would likely lead to stronger relationships between the variables.
A continuing research effort in this and other areas would make a strong contributions towards a fuller understanding of the factors or reliabilities which lead to long term relationships between industrial purchaser and markers.

METHODOLOGY

In methodology, the coefficient of correlation was used for measuring the association between initial reliabilities for the items when the items are correlated and then final reliabilities for the items when we remove those items which are correlated.

Formula

$$r = \frac{n\sum UV - \sum U \sum V}{\sqrt{[n\sum U^2 - (\sum U)^2]} \times \sqrt{[(n\sum V^2 - (\sum V)^2)]}}$$
Where U = X-A; V= Y-B
A & B are assumed mean.

Hypothesis

Also we have set null hypothesis (Ho) taking assumptions
H_0: $\mu \neq 0.625$ (Standard reliability)
ie $\mu > 0.625$ or $\mu < 0.625$ (Two tailed test)

Statistical Test

We have used t-test because size of sample is less than 30
$t = (\bar{x} - \mu)/s/\sqrt{n}$
Where μ = standard reliability of population
$\bar{x}$ = sample reliability
s = standard deviation of sample
n = size of sample
The tabulated value of t at 5% level of significance when degree of freedom is 4 is 2.132

Data

The source of data is secondary and has been collected from the European Journal of Marketing, Vol 26 No 2, 1992, pp 27-46

Table 1

No	Latent Variable Reliability	Initial reliability		Final Reliability	
		Items	Reliability	Items	
1.	Social Exchange	7	0.800	5	0.802
2.	Product importance	6	0.814	5	0.840
3.	Co-operation	6	0.638	4	0.667
4.	Adaptation	5	0.638	3	0.672
5.	Information Exchange	6	0.476	2	0.757

CALCULATION:

    a)   Calculation of Coefficient of Correlation between initial reliability and final reliability of items

Initial Reliability α_1	$U=\alpha_1-0.638$	U^2	Final reliability α_2	$V=\alpha_2-0.667$	V^2	UV
0.800	0.162	0.026	0.802	0.135	0.0182	0.021
0.814	0.176	0.036	0.840	0.173	0.0299	0.031
0.638	0.000	0.000	0.667	0.000	0.0000	0.000
0.641	0,003	0.00009	0.672	0.005	0.000025	0.000015
0.476	-0.162	0.026	0.757	0.09	0.0081	-0.014
	$\sum U=$ 0.179	$\sum U^2=$ 0.082		$\sum V=$ 0.403	$\sum V^2=$ 0.056	$\sum UV=$ 0.036

$$r = (n\sum UV - \sum U \sum V)/\sqrt{[n\sum U^2 - (\sum U)^2]}\sqrt{[n\sum V^2 - (\sum V)^2]}$$

$$= \frac{5 \times 0.036 - 0.179 \times 0.403}{\sqrt{5 \times 0.082 - (0.179)^2}\sqrt{5 \times 0.056 - (0.403)^2}}$$

$$= \frac{0.183 - 0.0721}{\sqrt{0.378}\sqrt{0.118}}$$

$$= \frac{0.1058}{0.2074} = 0.52 \; ; r = 0.52$$

    b)   Measuring Significance

Difference between standard reliability of the population and initial reliability of the items before adjustment. (We don't remove those items which correlate under latent variable)

α_1	$(\alpha_1-\bar{\alpha}_1)$	$(\alpha_1-\bar{\alpha}_1)^2$
0.800	0.1262	0.0159
0.814	0.1402	0.0196
0.638	0.0358	0.0012
0.641	0.0328	0.0010
0.476	0.1978	0.0391
$\sum \alpha_1 = 3.369$		$\sum(\alpha_1-\bar{\alpha}_1)^2 = 0.0768$

$$\bar{\alpha}_1 = \sum \alpha_1/n = 3.369/5 = 0.6738$$

Null hypothesis (Ho) - There is no significant difference between standard reliability and initial reliability of items. ie, Ho: $\mu \neq 0.0625$; $\mu > 0.625$ or $\mu < 0.625$ (Two tailed)

$t = (\bar{x} - \mu)/s/\sqrt{n}$ or $t = (\bar{\alpha_1} - \mu)/s/\sqrt{n}$

$S = \sum(\alpha_1 - \bar{\alpha_1})^2/n-1 = .0768/5-1 = 0.0192$

Now, $t = 0.6738 - 0.625/0.0192/\sqrt{5} = 0.0488/0.0627 = 0.778$

But tabulated value of $t_{0.05}$ at 4 df = 2.132

Since calculated value is less than tabulated value, null hypothesis is accepted. That is, there is no significant difference between standard reliability and initial reliability of items.

© Measuring Significance of the difference between standard reliability of the population and final reliability of the items after adjustment (after removing those items which correlate under latent variable)

α_2	$(\alpha_2 - \bar{\alpha_2})$	$(\alpha_2 - \bar{\alpha_2})^2$
0.802	0.0544	0.0020
0.840	0.0924	0.0085
0.667	-0.0806	0.0064
0.672	-0.0756	0.0057
0.757	0.0094	0.00008
$\sum \alpha_2 = 3.738$		$\sum(\alpha_2 - \bar{\alpha_2})^2 = 0.0235$

$\bar{\alpha_2} = \sum\alpha_2/n = \dfrac{3.738}{5} = 0.7476$

Null Hypothesis (Ho) - There is no significant difference between standard reliability and final reliability of items. i.e. Ho : M $\neq$ 0.625 ; M > 0.625 or M < 0.625 (two tailed test)

$t = (\bar{x} - \mu)/s/\sqrt{n}$ or $t = (\bar{\alpha_2} - \mu)/s/\sqrt{n}$

$s = \sum(\alpha_2 - \bar{\alpha_2})^2/(n-1) = \dfrac{0.0235}{(5-1)} = \dfrac{0.0235}{4} = 0.0058$

Now $t = (\bar{\alpha_2} - \mu)/s/\sqrt{n} = (0.7476 - 0.625)/0.0058/\sqrt{5} = 0.1226/0.0026 = 47.15$

But tabulated value of $t_{0.05}$ at 4 df = 2.132

Since calculated value is more than tabulated value, null hypothesis is rejected and alternative hypothesis is accepted. That is, there is a significant difference between standard reliability and final reliability of items.

Result

A positive correlation exists between initial reliabilities and final reliabilities. Initial reliabilities are taken for those items which are correlated and final reliabilities are taken after removing those items which are correlated.

On applying t test we find null hypothesis is accepted for standard and initial reliability of the sample. While it is rejected or alternative hypothesis is accepted when we measure significant or insignificant difference between standard and final reliability of items.

Managerial Implications

The findings indicate that the exchange of information and interpersonal contact produce a co-operative atmosphere between buyer and seller which in turn, sets the stage for mutual adaptation.

Thus buyer and sellers must first create mechanisms which facilitate the exchange of information and the establishment of personal relationships between members of the two firms. General Motors in Canada for example, instituted a supplier's council, the primary purpose of which was to achieve a two-way flow of information exchange.

The findings also indicate that given the establishment of a co-operative environment between buyer and seller, particularly for products perceived as being important to the purchasing firm, the tendency for both firms will be to seek close ties with each other. Customers will be more likely to join with vendors in mutual adaptations, particularly with regard to joint product development.

CONCLUSION

It has become increasingly important to understand the reliability which is important to the development and maintenance of close buyer seller relationships. While total size of the business is expected to increase over the next few decades, the number of market opportunities for suppliers will decrease for several reasons. For instance, just-in-time manufacturing systems are being adopted rapidly, especially in assembly industries. At the same time, strategic alliances are being built on a global basis. As the realities of this increasingly competitive environment sink in, industrial marketing managers will find that it is imperative to understand the reliability that is critical to the development of close relationships with their important customers.

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