Identification of Microvariables for SUPPLY Chain Management practices in context of Flexible system in Indian Gas industry.

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Abstract—The paper describes a set of micro variables for the Supply Chain Management (SCM) practices in perspective of flexible system (FS) practices and sets them into different categories for Indian gas industry. Based on a detailed analysis of literature, thirty two micro variables were identified and an arranged in a questionnaire form varying from junior to senior level of managers from different sectors of gas industry. A total of 325 valid responses were received in questionnaire form and rated on likert scale and other tests were done in order to check the consistency of the data. Confirmatory Factor analysis is done on SCM practices in context of FS Practices. Later the study was done to treasure their importance in emerging Indian gas industry. This work can help Indian gas sector supervisors and leaders to recognize the significance of SCM practices in terms of FS practices.

Keywords: Supply Chain Management, Customer focus, Flexible System, Practices, Indian gas Industries.

Introduction

Gas industry among leading area in Indian industries, which consists of different sectors and having different level of workers, managers and leaders in order upgrade the different segments in gas industry including production and exploration activities exploration and production activities, players in storage and transportation refining, processing and marketing of gas products.

Literature survey

The literature

Standard operating procedures is analogous to money, its impact depends on the stock of knowledge and speed of its circulation (Prahalad and Hamel 1990). The definition given by

Dodson (1999), states that the task or instructions are inflexible while guidelines suggest that action can be more flexible and usable. The reliability is calculated by computing to find the nature of data. Factor analysis reduces the data and shows the interrelationship between different variables and their dependency and reports the issue and helps in creating the group data from a large number of variables, and enlightens these variables in relations to their common underlying dimensions (Zhang et al., 2000). Wadhwa and Rao (2000) have emphasized on manufacturing and design flexibility and suggested that product flexibility can often be more effectively derived as design flexibility. The operating procedures by Wevder (2001) mentions that established, pertinent and always followed is a key component to a successful and well run organization. The contest for firms nowadays is not just to take up a SCM initiative but also to implement it effectively as the future shall see a competition among supply chains. Gunasekaran, et al. (2001) explored that SCM needs to be evaluated for its performance in order to evolve a competent and effective supply chain. Zhang et al., (2003) proposed another framework for the flexibilities.Suhong (2005) conceptualizes, develops, and validates six dimensions of SCM practices (strategic supplier partnership, customer relationship, information sharing, information quality, internal lean practices, and postponement) According to Hair et al. (2005), factor loadings more than 0.30 are considered as significant; loadings with 0.40 are considered as more important, while loadings which are more than 0.50 are very significant. As such, a factor loading with 0.50 was used as the cutoff point (Hair et al., 2005).Again here, some researchers have expressed caution on pointing to a directive relationship while others were more forthcoming in that regard. Ozag (2006) expressed his caution when he inspected findings of the relationships among trust and both normative and continuance commitment of merger survivors. The study by Nwokah (2006) also confirmed that increase in customer focus lead to an increase in company's sales growth, its profitability, and its market share performance. With factor analysis, the construct validity of a questionnaire can be tested (Ratray and Jones, 2007); it allows studying the correlation between a large numbers of interrelated quantitative variables by grouping the variables into new factors. The factor analysis is done with the variables of management system practices. Cai (2008) remarked that organizational customer preferences affects customer relationship practices which finally influence the organizational performance. (Katcher, 2008). Hence, different descriptions of communication make it a broader dimensional notion as a replacement for only information circulation in isolation. They have included some

other flexibility which is related to human being also. According to Saxena and Wadhwa (2009), as competition and complication have increased, flexibility-based supply chain management (SCM) has developed as an increasingly important issue for companies. The algebraic matrix calculations finally end up with eigen vectors and the longer an eigen vector is, the more variance it explains, the more important it is (Field et al., 2009). SCM is an idea that is gaining in popularity and importance by (Dag, D. and Stevenson, 2010) brings some clarification to the thought of SCM by exploring some of the more prevalent SCM definitions, frameworks. The seven components in a flexible system is proposed by Prakash (2011) are machine flexibility, manufacturing flexibility, material handling flexibility, labour flexibility, volume flexibility, routing flexibility, and mix flexibility. Their studies are related to the competence and customer satisfaction by analysing the relationships among the different flexibilities.Effective communicating methods in an organization allow the employees to recognize the roles and functions that are expected from them. Employees in the institute often believe that the flow of communication among the different departments in their respective organizations is poor, which results in reduced quality of products and services delivered by the organization. The flexibility of an organization and its ability to respond to new customer demands governs the competitiveness of it in the market (Prakash, 2011). This flexibility in the production processes has become very crucial for an organization to remain competitive and profitable. The management of the supply chain and the roles of several actors associated differ from industry to industry and company to company by (Rajendra et al., 2011) present's main activities of supply chain and the step-by-step approach for understanding a broad picture of supply chain. The study conducted by (Rachid and James, 2011 related with Correlation analysis revealed that perceived effectiveness of communication between management and employees, commitment and pride in working for the company and trust were significantly interrelated. They need to focus on supply chain management practices that have impact on enhancing SCM activities and ultimately performances (Arawati, 2011).

There are studies which suggest that interdepartmental tasks have a positive impact on flexible system practices. Uzma and Shahbaz (2012) tested the relationship of interdepartmental communication with organizational performance study was conducted and data was collected through survey questionnaire method strongly mediating the relationship of interdepartmental communication and organizational performance.

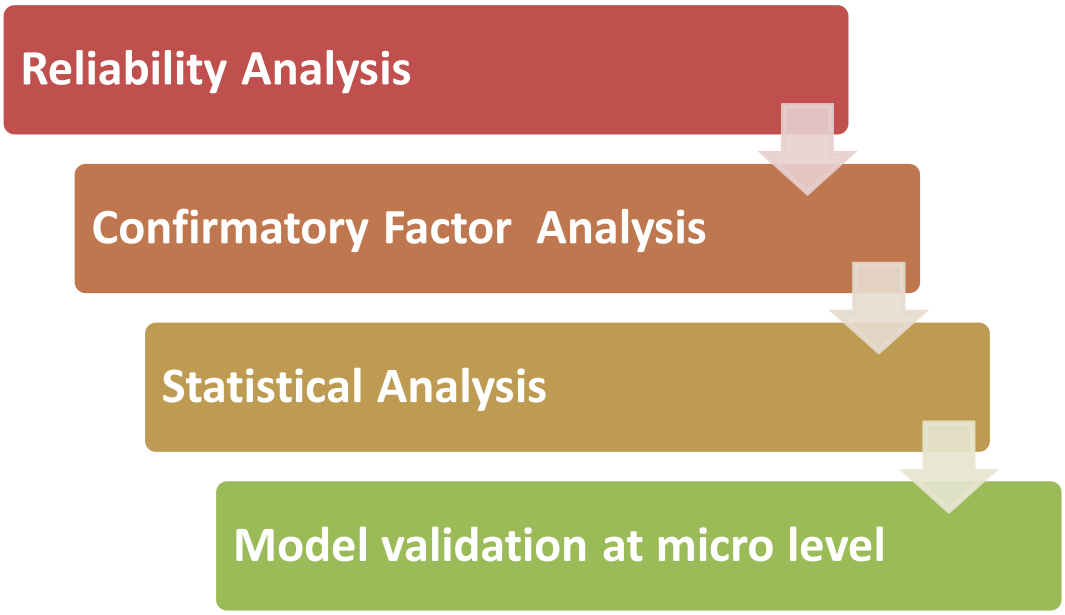

Figure 1: Methodology for analysis at micro level study

Reliability means the ability of a tool to measure reliably and steadily. Reliability testing is done on data for independent variables to calculate the coefficient of reliability based on the average correlation of the data and comparing with standardized data. The data in the form of questionnaire was send to different level of officers and leaders in gas industry and that data was was scrutinized and incomplete questionnaires were discarded.and then selected data was represented in excel sheet for analysis and for detailed analysis the computer software "Statistical Package for Social Sciences (SPSS-16) for testing of the collected data.The reliability tests was done on 325 samples which was collected from various gas industries out of which 250 responses were included rest all were discarded. It means around 60% of the data is included rest all discarded which is appreciable data in Indian The questionnaire having different sections tells the data accuracy in terms of reliability.For internal consistency the Cronbach's Alpha was

calculated and key indicators was identified.If the value of alpha is high, it means data have good relliability The values of Cronbach's Alpha obtained are given in table 1.

Table 1: Cronbach-alpha (α) values

S. No.	Questionnaire	Cronbach Alpha (α)
1	a1.1-a1.6	Not Applicable
2	a2.1-a2.2	Not Applicable
3	a3.1a3.6	Not Applicable
4	b1.1-b1.10	0.67
5	b2.1-b2.8	0.822
6	b3.1-b3.6	0.812
7	c1.1-c1.10	0.831
8	c2.1-c2.11	0.759
9	c3.1-c3.6	0.725

The above table of cronbach's Alpha tells a good reliability and indicated and allows to further do calculations and interpretations and then the detailed analysis was done. The initial part of questionnaire was related to personal data as name of organization, year and designation etc

The reliability coefficients of the SCM practices and its aspects was found (α =0.55, 0.722 and 0.68) to be significant. The vaues in table 1 clearly shows that there are four set of variables and their eigen values more than 1.

ITEM	Factor 2: FS Practices	Factor 3: SCM Program	Factor 4: SCM Practices
FSPIDT FSPSOP FSPFLX	0.618 0.840 0.774		
SCMECR SCMBDT SCMCBA		0.865 0.752 0.744	

CUSTRLP STATRLP			0.812 0.835

Note: i. Extraction method: principal component analysis

ii. Rotation Method: Varimax with Kaiser Normalization

The varimax rotated confirmatory factor analysis for FS practices, SCM program and SCM practices was done and The cumulative variance was 51.99. SCM program was made up of three micro variables of effective customer's relations, building trust and co management activities. The total cumulative variance was 38.521. The two micro variables confirmed by confirmatory factor analysis were the Strategic relationship and customer relationship, representing the SCM practices macro variables. The grouped factor gave a total variance of 56.39 per cent. We can calculate an eigenvector's value by counting up the loadings of each variable on the eigenvector.

Table 3: Summary of confirmatory factor analysis for macro variable

Macro variable	**Micro variables confirmed by factor analysis**	**Excluded variables in factor analysis**	**Cumulative (per cent) of the variance**
FS Practices	Interdepartmental task forces Standard operating procedures Flexible approach	----------	41.90
SCM Program	Effective customer relations Building trust Co management base activities	----------	32.62
SCM Practices	Customer relationship Strategic relationship	----------	60.29

(N=325)

CONCLUDING REMARKS

The hypotheses was created based on research objectives and then transferred into questionnaire. The progression of preparing the questionnaire and all aspects were considered and then finalized and further asked the respondents to fill the questionnaire. Before final conclusion a pilot survey was done by distributing the questionnaire to few key persons ranging from manager from different gas industries were gathered. The study process is based on the empirical survey which is the key method to find views of the major issues of the gas industry. . A detailed study in the form of survey was done for collecting and have a large sample size. Although lot of responses was received but only 325 responses were finalized for further study.The various tests was done as reliability analysis, Cronbach's alpha whose acceptable range is 0.5 are done on samples in order to reduce to data in various groups of micro variables data. The varimax rotation was carried micro level for factors in gas industry and only eigen values greater than 1 was considered and rest all data were not considered.Later on the same data tha descriptive statistical analysis was done at both levels at macro and micro and based on their interrelationship the models were generated

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