Term Project

ON

Identification of Critical Success Factor for implementation of Information Technology for Supply Chain Management in Indian Automobile Industry

Submitted By:

Amit Sardana

Roll No.: DTU/2K14/MBA/501

Under the Guidance of:

Dr. Mohit Tyagi

DELHI SCHOOL OF MANAGEMENT

DELHI TECHNOLOGICAL UNIVERSITY

BAWANA ROAD DELHI 110042

Jan-May, 2016

DECLARATION

I Amit Sardana student of EMBA 2014-2016 batch of Delhi School of Management, Delhi Technological University, Bawana road, Delhi-42 declare that term project on Identification of Critical Success Factor for implementation of Information Technology for Supply Chain Management in Indian Automobile Industry. Submitted in partial fulfillment of Executive MBA program is the original work conducted by me.

The information and data given in the report is authentic to the best of my knowledge.

This Report is not being submitted to any other University for award of any other Degree, Award and Fellowship.

Amit Sardana

Place: New Delhi

Date: 05-20-2015

ACKNOWLEDGEMENT

I express my sincere thanks to Dr. Mohit Tyagi for his support and guidance to complete the project.

TABLE OF CONTENTS

Table of Contents

1. Abstract –

In today's highly competitive world every industry/company is trying to identify critical success factor which will enable to them to implement latest technology changes which will give them long-term sustainable edge and differentiates them form their competitors. This study identifies the critical success factor for implementation of Information technology system for Supply Chain Management in Automobile Industry particularly in Indian context. Success factors were identified by comprehensive literature review and interviews with experts to capture their opinions. ISM method was used to study interrelationship of the critical success factors identified.

Framework developed helps managers to form their strategy for implementation of IT system for supply chain Management.

2. Introduction –

Indian Automobile Industry is one of the key contributors to National Economy it accounts for 7.1 percent of the GDP, 45 percent of the manufacturing GDP, contributed 4.3 percent to exports, and 13 percent to excise revenues. Indian government with 'Make in India' program which is designed to facilitate investment, foster innovation, enhance skill development, protect intellectual property and build best in class manufacturing infrastructure. Auto Industry is giving lot of thrust to become more competitive and to use best in class processes and practices.

Supply Chain Management deals with the management of materials, information, and financial flows in a network consisting of suppliers, manufacturers, distributors, and customers as defined by Stanford Supply Chain Forum. According to Womack and Jones (2005) SCM is a key component to make organization more effective and efficient in current competitive environment.

Companies are putting lot of effort and time to improve performance of supply chain to reduce their overall operational cost and to be competitive. Beynon-Davis (2009) defines IT as any technology used to support information gathering, processing, distribution, and use and is composed of hardware, software, data, and communication technology. Bayraktar et al.(2009) found that companies are focusing towards implementation of the IT systems in

SCM practice to improve their performance in global competitive markets. With changing era corporate are moving towards adoption of Information Technology (IT) as key element in managing supply chain processes. According to Chen and Paulraj(2004) IT implementation has a direct effect on supply chain performance and it is more significant than its effect on financial performance because supply chain performance in turn includes the various dimensions like as cost, quality, flexibility, and delivery. Pereira (2009) says that IT is an efficient tool which enhances the information flow and also creates a robust and resilient supply chain. IT has led to better performance of both the focal firm and the partners in the supply chain (Jin, 2006).
As companies focus to become more agile, competitive, there is a need to implement IT for supply chain management.

As Indian Automobile industry is evolving and becoming part of global supply chain, there is a need to adopt IT for Supply Chain Management. There have been various studies on impact of IT on SCM performance (M.Tyagi et al. 2014), but researchers have overlooked the identification of critical success factor for implementation of Information Technology for Supply Chain Management in Indian Automobile Industry. This study aims to identify critical success factor based on literature review and field experts' opinion, and to analyze their interrelationship and interdependence using ISM and Mic Mac Analysis.

The remaining of this paper is organized as follow – Section 2 briefly discussed about Supply Chain Management, various factors impacting supply chain management in Automobile industry and dimensions of IT system implementation. Section 3 includes model description; section 4 gives a step by step procedure of solution methodology. Result, discussion and conclusion are incorporated in section 5 and section 6 respectively.

3. Literature Review –

Critical success factors are those few things that must go well to ensure success for a manager or an organization, and, therefore, they represent those managerial or enterprise area, that must be given special and continual attention to bring about high performance. CSFs include issues vital to an organization's current operating activities and to its future success (Boynlon, A.C., and Zmud, R.W. 1984).

Top five supply chain challenges that must be addressed are visibility, cost containment, risk management, increasing customer demands and globalization. It is interesting to note that automotive supply chains, globally, lag behind other supply chains (such as retail, pharmaceutical etc.) in these five parameters clearly indicating the need for and scope of considerable improvements to make them more effective and responsive.

Information technology (IT) has gained a lot of importance in SCM implementation in recent years. Increasingly, supply chain operations are changing from electronic data interchange systems and enterprise resource planning systems to internet/intranet to support SCM (Pant, Sethi, & Bhandari, 2003). Lancioni, Smith, and Oliva (2000) observed that use of modern technologies in SCM can lead to advantages such as cost saving, quality improvement, delivery and support, and greater competitive advantage. Du et al. (2012) says that IT implementation has been conveyed as a tool to improve supply chain flexibility and responsiveness, in context of improving the supply chain flexibility and responsiveness, in the context of firm's competitiveness.

Top Management Support and commitment plays a major role in implementation of a companywide new initiative. With top management support, user resistance can be partially mitigated by having top executives encourage or even mandate, user engagement in implementation. (Wang and

Chen, 2006).The involvement of top management is also vital for the effective re-engineering of the supply chain and logistics processes (Gunasekaran et al. 2004) leading to successful Inter organizational systems and relationship. IT implementation require that key people throughout the organization create a clear, compelling vision and strategy of how the company should operate in order to satisfy key stakeholders that is customers, empower employees, and facilitate suppliers. There must also be clear definitions of goals, expectations, and deliverables. (Umble 2003). Project Management plays an important role in implementation as right mix of planning, monitoring, and controlling can make the

difference in completing a project on time, on budget, and with high quality results (S. Laughlin 1999). Implementation of IT system in SCM requires lot of changes in the current processes and way people do their job. Change Management plays a key role to help people to adapt to new changes with minimal resistance. (T. Minahan, 1998).Change management is the discipline that guides how we prepare, equip and support individuals to successfully adopt **change** in order to drive organizational success and outcomes.

Effective communication in regard to the rationale for the implementation and details of the business process management change with the employees (Dezdar, S., Sulaiman, A., 2009) is very important. Extensive education and training is one of the most widely recognized critical success factors, because user understanding and buy-in is essential. Full benefits cannot be realized until end users are using new system properly. (H. Hutchins ,1997).

Performance measures that assess the impact of the new system must be carefully constructed. Of course, the measures should indicate how the system is performing. But the measures must also be designed, so as to encourage the desired behaviors by all functions and individuals. Such measures might include on-time deliveries, gross profit margin, customer order-to-ship time, inventory turns, vendor performance, etc. The system must be forever monitored and measured [H. Hutchins , 1998].

The studies by Leidner & Kayworth (2006) have shown that the success rate of the system that is being implemented increases if the system is aligned with the organizational culture. In connecting distinct platforms, applications and data formats across the value chain, enterprises have to overcome various obstacles such as user resistance to change and reluctance for establishing a company culture open to sharing business processes and to collaboration (Stefanou 1999).

IT system integrates companies both upstream and downstream therefore inter organizational factors becomes important and critical. Successful implementation of inter organizational system requires the cooperation and commitment of trading partners (Premkumar and Ramamurthy 1995), thus developing cordial relationships and partnerships (Gunasekaran et al. 2008; Ketikidis et al. 2008) forms the basis of successful implementation. The literature has also researched trust between trading partners and has confirmed the trusting relationship as a critical factor for the success of IT system implementation.

Mutual trust refers to the fact that the channel members have confidence in their partners' reliability and honesty; namely, the channel members do business with one another on a

foundation of mutual trust so the long-term and extra benefits are achieved. Soliman and Janz (2004) in the study have emphasized the importance of having trusting relationship in implementation of Inter organizational information systems.

Project team composition plays a critical role in the implementation of the system. A cross functional team should consist of the best people which understand the organization's business strategy and system's technical know-how. Loh and Koh (2004). According to the research by Nah et al., (2003) team should be cross functional and should be on project full time with implementation being their only priority. Further the team members must be empowered to make quick decisions and should have clear communication with the Management.

User Support and Involvement is critical as the system being implemented is for the employees therefore the user involvement and participation should start much before the implementation takes place as has been emphasized by various studies (Bingi et al. 1999;Holland et al. 1999).

	Factors Impacting IT Implementation	**References**
1	Top management commitment/Support	Wang and Chen 2006 , Gunasekaran et al. 2004
2	Clear Vision and Business Strategy	Umble et al.(2003)
3	Effective Project Management	S. Laughlin 1999
4	Organizational Culture	Leidner, D. E., & Kayworth, T. (2006) , Stefanou 1999
5	Change Management	T. Minahan(1998)
6	Effective Communication	Dezdar, S., Sulaiman, A., 2009
7	Education and Training	H. Hutchins ,1997
8	Focused performance measures	H. Hutchins , 1998
9	Cooperation and Commitment of Trading Partners	Premkumar and Ramamurthy 1995 , Gunasekaran et al. 2008; Ketikidis et al. 2008
10	Trust among channel members	Soliman, Janz (2004)
11	User Support and Involvement	Bingi et al. 1999;Holland et al. 1999
12	Project team composition	Loh ,Koh (2004)

4. Research methodology

ISM is a technique to analyze the complex socio economic system to analyze the complex socio economic systems (Warfield, 1973, 1974). It is a computer-assisted learning process that generally used to resolve the complex situations by providing a feasible course of action (Kannan et al., 2009).

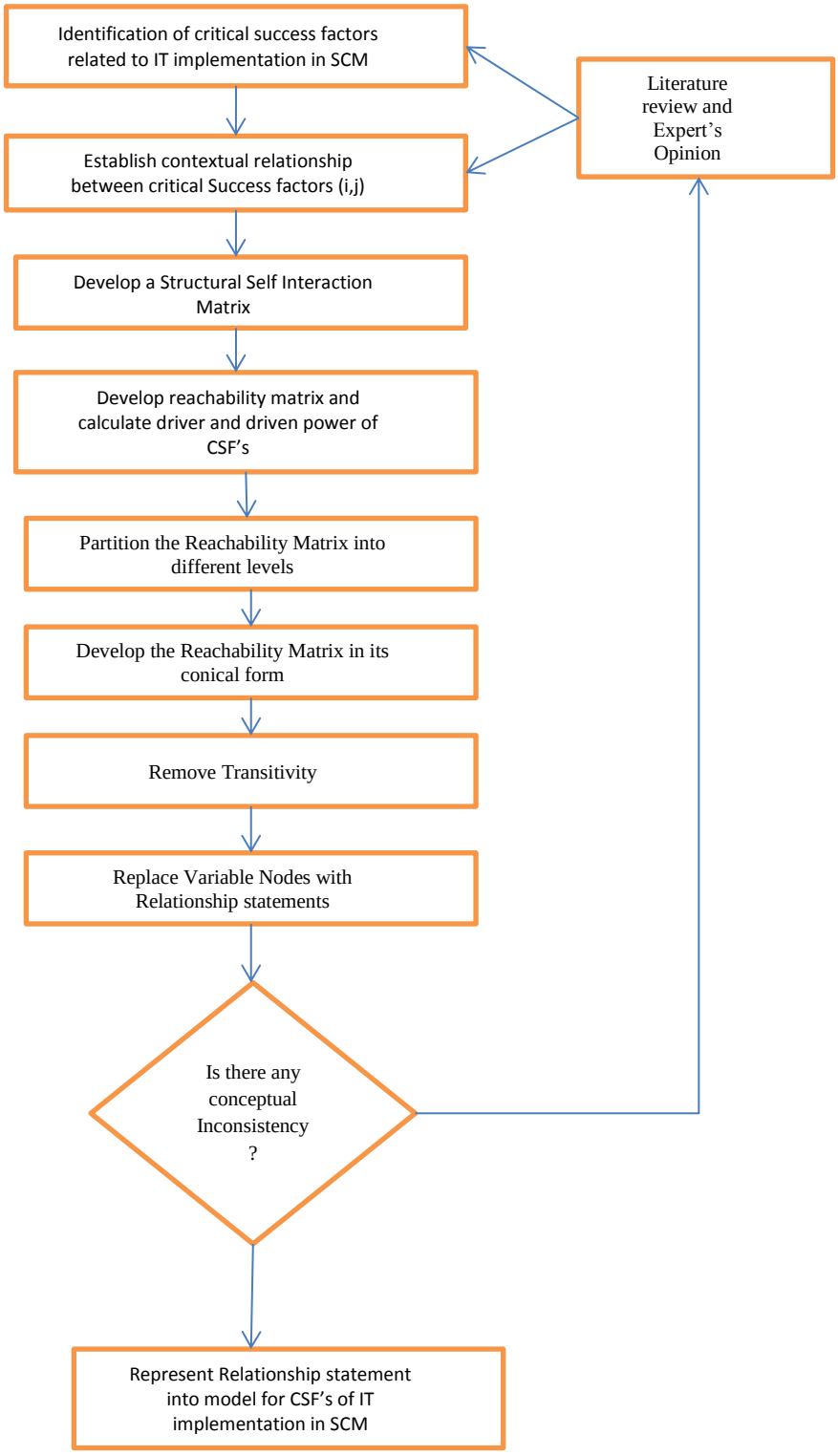
This approach addresses visibility of a model by transforming uncertain and roughly expressed models of systems into the precise and observable models (Sage, 1977). It is used only as an approach to give directions about the difficulty in relationship among the CSF's but will not provide any weight vector for existing CSF's (Kannan et al., 2009).

The steps, involved in the ISM methodology, are given below (Kannan and Haq, 2007):

1. Identify and enlist the existing critical success factors for implementation of IT in SCM.
2. Establish a contextual relationship for each pair of drivers recognized in step 1.
3. Develop a structural self-interaction matrix (SSIM) for drivers which indicate pairwise relationships among drivers of the system under consideration.
4. Development of reachability matrix from the SSIM and checking of reachability matrix for transitivity. The transitivity rule for the contextual relationship follows the Zeroth law of thermodynamics.
5. On the basis of the established relationships in the reachability matrix, a flow graph may be drawn without indicating transitive links.
6. Convert the resultant digraph into an ISM by replacing driver nodes with statements.
7. Check for conceptual inconsistency and necessary modifications made.

The flow chart of the methodology adopted for the present work is shown in Figure 1.

Figure 1 Flow chart for ISM approach



5. Applications of proposed method

Step 1: Critical Success Factor identification

The various important Critical Success factors of IT implementation for SCM are identified from the critical review of literature as well as out of discussion with the field experts and are given in Table 1.

Step 2:

From the factors identified in step 1, contextual relationship among factors is examined.

Step3:

In the present research for identifying the contextual relationship among the CSF's of IT implementation in SCM, two experts from academia and two experts from automobile industry, were consulted. These experts from the academia and from the industry were well conversant with IT implementation for SCM in Indian automobile industry. Based on contextual relationship among the variables SSIM has been developed. Four symbols have been used to denote the direction of the relationship between the variables (i and j):

V- Variable i will help to achieve variable j;

A- Variable j will help to achieve variable i;

X- Variable i and j will help to achieve each other; and

O- Variable i and j are unrelated.

SSIM was developed using the above illustrated symbols. Please find illustration below –

- Top Management commitment/support helps to achieve Clear Vision and Business Strategy; hence in SSIM it is depicted by 'V'.
- Effective Communication helps to achieve Clear Vision and Business Strategy; hence in SSIM it is depicted by 'A'.
- Effective Project Management and Change Management CSF's help each other; hence in SSIM it is depicted by 'X'.

- Cooperation and Commitment of Trading Partners and Project team composition are unrelated; hence in SSIM it is depicted by ‘O’.

Table 2 – SSIM for Critical Success Factors for IT Implementation

	Critical Success Factors for IT Implementation	CSF 12	CSF 11	CSF 10	CSF 9	CSF 8	CSF 7	CSF 6	CSF 5	CSF 4	CSF 3	CSF 2
1	Top management commitment/Support	O	V	V	O	V	V	V	V	V	V	V
2	Clear Vision and Business Strategy	O	V	O	V	V	V	A	V	A	V	-
3	Effective Project Management	A	V	A	X	V	O	A	X	A	-	
4	Organizational Culture	O	V	A	V	V	V	X	V	-		
5	Change Management	A	A	O	O	V	A	A	-			
6	Effective Communication	V	V	X	V	O	V	-				
7	Education and Training	A	V	O	O	V	-					
8	Focused performance measures	O	A	O	A	-						
9	Cooperation and Commitment of Trading Partners	O	O	A	-							
10	Trust among channel members	V	V	-								
11	User Support and Involvement	X	-									
12	Project team composition	-										

Step 4: Reachability Matrix:

Initial Reachability matrix was developed using SSIM and following stated rules:

• If the (i, j) record in the SSIM is V, then set the (i, j) record in the reachability matrix to 1 and the (j, i) record to 0.

• If the (i, j) record in the SSIM is A, then set the (i, j) record in the reachability matrix to 0 and the (j, i) record to 1.

• If the (i, j) record in the SSIM is X, then set the (i, j) record in the reachability matrix to 1 and the (j, i) record to 1.

• If the (i, j) record in the SSIM is O, then set the (i, j) record in the reachability matrix to 0 and the (j, i) record to 0.

Table 3 – Initial Reachability Matrix

	Intial Matrix	CSF 1	CSF 2	CSF 3	CSF 4	CSF 5	CSF 6	CSF 7	CSF 8	CSF 9	CSF 10	CSF 11	CSF 12
1	Top management commitment/Support	1	1	1	1	1	1	1	1	0	1	1	0
2	Clear Vision and Business Strategy	0	1	1	0	1	0	1	1	1	0	1	1
3	Effective Project Management	0	0	1	0	1	0	0	1	1	0	1	0
4	Organizational Culture	0	1	1	1	1	1	1	1	1	0	1	0
5	Change Management	0	0	1	0	1	0	0	1	0	0	0	0
6	Effective Communication	0	1	1	1	1	1	1	0	1	1	1	1
7	Education and Training	0	0	0	0	1	0	1	1	0	0	1	0
8	Focused performance measures	0	0	0	0	0	0	0	1	0	0	0	0
9	Cooperation and Commitment of Trading Partners	0	0	1	0	0	0	0	1	1	0	0	0
10	Trust among channel members	0	0	1	1	0	1	0	1	1	1	1	1
11	User Support and Involvement	0	0	0	0	1	0	0	1	0	0	1	1
12	Project team composition	0	0	1	0	1	0	1	1	0	0	1	1

The Final reachability matrix as shown in Table 4 was developed with help of initial reachability matrix using transitivity rule, i.e. if a CSF ‘Z’ helps to achieve ‘X’ and ‘X’ helps to achieve ‘Y’, than ‘Z’ will help to achieve ‘Y’.

Table 4 – Final Reachability Matrix

	Final Matrix	CSF 1	CSF 2	CSF 3	CSF 4	CSF 5	CSF 6	CSF 7	CSF 8	CSF 9	CSF 10	CSF 11	CSF 12	Driver Power
1	Top management commitment/Support	1	1	1	1	1	1	1	1	1	1	1	1	12
2	Clear Vision and Business Strategy	0	1	1	0	1	0	1	1	1	0	1	1	8
3	Effective Project Management	0	0	1	0	1	0	0	1	1	0	1	1	6
4	Organizational Culture	0	1	1	1	1	1	1	1	1	1	1	1	11
5	Change Management	0	0	1	0	1	0	0	1	1	0	1	0	5
6	Effective Communication	0	1	1	1	1	1	1	1	1	1	1	1	11
7	Education and Training	0	0	1	0	1	0	1	1	0	0	1	1	6
8	Focused performance measures	0	0	0	0	0	0	0	1	0	0	0	0	1
9	Cooperation and Commitment of Trading Partners	0	0	1	0	1	0	0	1	1	0	1	0	5
10	Trust among channel members	0	1	1	1	1	1	1	1	1	1	1	1	11
11	User Support and Involvement	0	0	1	0	1	0	0	1	0	0	1	0	4
12	Project team composition	0	0	1	0	1	0	1	1	1	0	1	1	7
	Dependence Power	1	5	11	4	11	4	7	12	9	4	11	8	

Step 5: Level Partitions

The final reachability matrix was partitioned into different levels to find the reachability set, and antecedent set for each driver. The reachability set of a specific driver, involves of itself and the other drivers, which it may aid to accomplish. The antecedent set includes of the drivers themselves and the other drivers, which may provide assistance in achieving it, and then derived the intersection of these sets for all considered drivers. The reachability and antecedent set for each driver were found from the final reachability matrix as given in Tables 5 and 6. The driver which has same reachability set and intersection exists at level 'I' and occupies peak place in ISM model (Kannan and Haq,2007).

The drivers founding at level 'I' are discarded in next iteration. The next iteration was performed with the remaining drivers and by repeating the above process and performs these iterations continuously until the levels of each driver have been obtained.

Table 5: Level partition (Iteration – I)

Critical Success Factors	Reachability Set	Antecedent set	Intersection	Level
CSF 1	1,2,3,4,5,6,7,8,9,10,11,12	1	1	
CSF 2	2,3,5,7,8,9,11,12	1,2,4,6,10	2	
CSF 3	3,5,8,9,11,12	1,2,3,4,5,6,7,9,10,11,12	3,5,9,11,12	
CSF 4	2,3,4,5,6,7,8,9,10,11,12	1,4,6,10	4,6,10	
CSF 5	3,5,8,9,11	1,2,3,4,5,6,7,9,10,11,12	3,5,9,11	
CSF 6	2,3,4,5,6,7,8,9,10,11,12	1,4,6,10	4,6,10	
CSF 7	3,5,7,8,11,12	1,2,4,6,7,10,12	7,12	
CSF 8	8	1,2,3,4,5,6,7,8,9,10,11,12	8	I
CSF 9	3,5,8,9,11	1,2,3,4,5,6	3,5	
CSF 10	2,3,4,5,6,7,8,9,10,11,12	1,4,6,10	4,6,10	
CSF 11	3,5,8,9	1,2,3,4,5,6,7,9,10,11,12	3,5,9	
CSF 12	3,5,7,8,9,11,12	1,2,3,4,6,7,10,12	3,7,12	

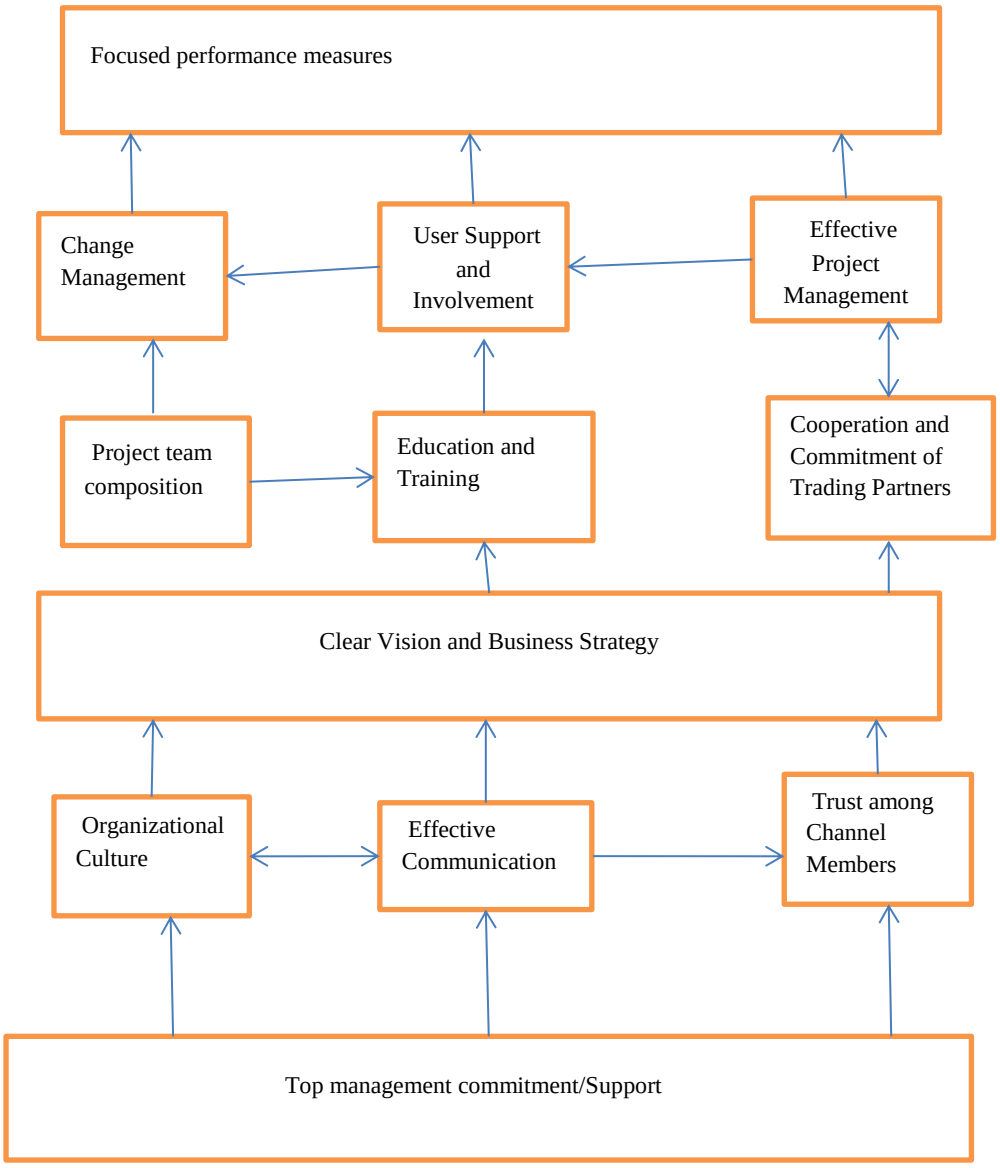
Table 6: Level partition (Iteration II-VI)

Critical Success Factors	Reachability Set	Antecedent set	Intersection	Level
CSF 1	1,2,3,4,5,6,7,9,10,11,12	1	1	VI
CSF 2	2,3,5,7,9,11,12	1,2,4,6,10	2	IV
CSF 3	3,5,9,11,12	1,2,3,4,5,6,7,9,10,11,12	3,5,9,11,12	II
CSF 4	2,3,4,5,6,7,9,10,11,12	1,4,6,10	4,6,10	V
CSF 5	3,5,9,11	1,2,3,4,5,6,7,9,10,11,12	3,5,9,11	II
CSF 6	2,3,4,5,6,7,9,10,11,12	1,4,6,10	4,6,10	V
CSF 7	3,5,7,11,12	1,2,4,6,7,10,12	7,12	III
CSF 9	3,5,9,11	1,2,3,4,5,6,9,10,12	3,5	III
CSF 10	2,3,4,5,6,7,9,10,11,12	1,4,6,10	4,6,10	V
CSF 11	3,5,9	1,2,3,4,5,6,7,9,10,11,12	3,5,9	II
CSF 12	3,5,7,9,11,12	1,2,3,4,6,7,10,12	3,7,12	III

Step6: ISM-Based Model

An ISM based model has been formulated on the basis of level partition (Table 5 and 6) for the critical success factors of IT implementation in supply chain management. The model shows relationship between the critical success factors. By using Final reachability matrix, a structured model is created and diagraph is drawn. Diagraph has been converted to ISM model shown in figure 2. Figure shows relationship among the critical success factors.

Figure 2 ISM based model for CSF's of IT implementation in supply chain management



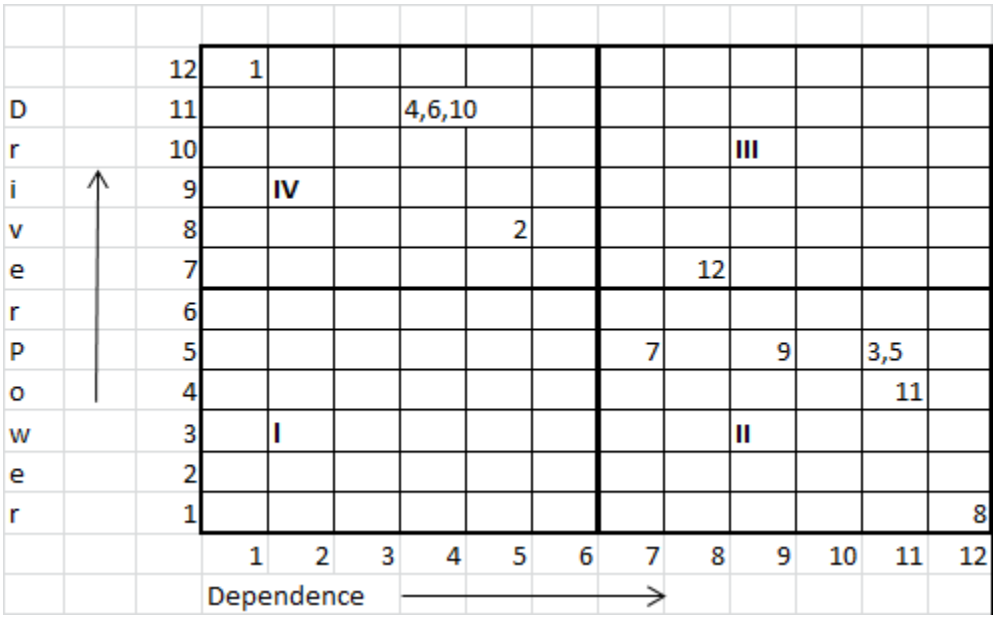
From figure 2, it is clear that Top management commitment/support forms the base of ISM hierarchy and is a key critical success factor for IT implementation in Supply Chain Management. ISM hierarchy helps to explain mutual relationship among CSF's. Top Management Commitment/Support drives Organizational Culture, Effective Communication and Trust among Channel partners which form the level2 at ISM hierarchy. These 3 CSF's are interrelated that is Effective Communication helps to

achieve Trust among channel members. Similarly Organizational culture helps in effective communication and vice versa. These 3 critical success factors help to achieve Clear Vision and Business Strategy formed by Top Management at level 3 of ISM hierarchy. Than Vision and business strategy forms the base for Cooperation and commitment of Trading partners, Education and Training and Project Team Composition at level 4. At Level 4 CSF's have mutual relationship that is based on Project Team composition Education and training is decided. Level 4 CSF's helps to achieve level 5 CSF's that is User Support and Involvement, Effective Project Management and Change Management. Effective Project Management helps User Support and Involvement and which in turn helps Change Management. Level 5 CSF's help to achieve Focused performance measures set for IT implementation which is at Level 6 of ISM hierarchy.

Step 7 MICMAC Analysis:

In MICMAC analysis, the CSF's, based on the analysis of dependence power and driver power of the variables, was classified into four sectors and is shown in Figure 3. The driving power and dependence of each CSF's has been calculated on the basis of final reachability matrix. The four sectors of MICMAC analysis are: Sector I: autonomous elements; Sector II: dependent elements; Sector III: linkage elements; and Sector IV: driver/independent elements. The CSF's having weak driver and weak dependence power exists in the Sector I. Such type of CSF's has few links with the other sectors CSF's and also disconnected from the system. Those CSF's having weak driving and strong dependence power will drop in Sector II. The CSF's with strong driving as well as dependence power will fall in Sector III and in last CSF's that have strong driving and weak dependence power exists in Sector IV (Kannan and Haq, 2007).

Figure 3 : Driving Power and dependence power diagram



Because, CSF's of Sector IV have high driving power thus they strongly affect the CSF's of other sectors. Hence, it is required to pay more attention to the CSF's that occupy the top position in ISM hierarchy to achieve better results.

From Figure 3, it is noted that no CSF's falls in Sector I. The six CSF's namely Effective Project Management, Change Management, Education and Training, Cooperation and Commitment of Trading Partners, Focused performance measures, and User Support and Involvement lies in Sector II. It means that these CSF's have low driving power and strong dependence. In sector III only one CSF's Project team composition which has high driver power and dependence power. Five CSF's Top management commitment/Support, Organizational Culture, Effective Communication, Clear Vision and Business Strategy and Trust among channel members lies in sector 1 which has strong driving power and low on dependence. Hence they formed the top levels in ISM hierarchy.

6. Results and discussion:

The driver and dependence power diagram (Figure 3) drawn from MICMAC analysis indicates the relative importance and interdependencies of critical success factors. Some of the observations drawn from the analysis are discussed below:

- Among considered critical success factor, no one lies in autonomous category i.e. in sector 1, this provides a positive base for study, and this means all the

factors considered are interrelated and plays an important role in implementation of IT in supply chain management.

- CSF's Effective Project Management, Change Management, Education and Training, Cooperation and Commitment of Trading Partners, Focused performance measures, and User Support and Involvement lies in sector II which means they have strong dependence and low on driving power.
  They can be achieved with help of critical success factors which have high driving power. As depicted in ISM model they are being driven by other factors which lie below them in model.
- CSF's Project team composition lies in Sector III which means they have strong dependence and driving power, project team composition plays an important role in implementation as it get drives by the factor and it also drives other factors for successful implementation.
- CSF's Top management commitment/Support, Organizational Culture, Effective Communication, Clear Vision and Business Strategy and Trust lies in sector 1 which have high driving power and low on dependence. It means they drive other CSF's and plays most important role for implementation of IT for SCM.

7. Conclusions:

The objective of this research was to identify critical success factor for implementation of IT in Supply chain management in automobile industries located in NCR of India. In accordance with objective 12 critical success factors were identified with help of literature review and interviews with industry expert. Interrelationship of these factors was analyzed with help of ISM. ISM based model (figure 2) provides a representation of CSF's based on their driving and dependence power.

Top management Commitment occupies the base position because of its high driving power which drives other factor which lies at level – II, III, IV, V and VI is ISM. All these are critical success factor of implementation of IT for supply chain management.

Study helps manager to formulate strategies for effective and successful implementation of IT in SCM by keeping critical success factor into consideration and their interdependence on each other.

8. Limitations and future scope

Current study took into consideration only the automobile industry of NCR region in India so it cannot be generalized to other industry and other regions. In future all different industries should be taken into consideration of entire region of India.

9. References

M. Tyagi et al.(2015) 'Analysis of interactions among the drivers of green supply chain management'

M. Tyagi et al.(2014) 'Selecting alternatives for improvement in IT enabled supply chain performance'

Manisha Seth, Ravi Kiran & D.P.Goyal 'Identification of Critical Success Factors for the Implementation of Supply Chain Management Information System through SEM Approach'

Kannan, G., Pokharel, S. and Kumar, P.S. (2009) 'A hybrid approach using ISM and fuzzy TOPSIS for the selection of reverse logistics provider', Resources, Conservation and Recycling, Vol. 54, No. 1, pp.28–36.

Barrat, M. (2004) 'Understanding the meaning of collaboration in the supply chain', Supply Chain Management: An International Journal, Vol. 9, No. 1, pp.30–42.

Bayraktar, E., Demirbag, M., Lenny Koh, S.C., Tatoglu, E. and Zam, H. (2009) 'A causal analysis of the impact of information systems and supply chain management practices on operational performance: evidence from manufacturing SMEs in Turkey', International Journal of production Economics, Vol. 122, No. 1, pp.133–149.

Benjamin, R. and Wigand, R. (1995) 'Electronic markets and virtual value chains on the information superhighway', Sloan Management Review, Vol. 36, No. 2, pp.62–72.

Cagliano, R., Caniato, F. and Spina, G. (2003) ‘E-business strategy: how companies are shaping their supply chain through the internet’, International Journal of Operations and Production Management, Vol. 23, No. 10, pp.1142–1162.

Chen, I.J. and Paulraj, A. (2004) ‘Towards a theory of supply chain management: the constructs and measurements’, Journal of Operations Management, Vol. 22, No. 2, pp.119–150.

Clark, T.H. and Lee, H.G. (2000) ‘Performance, interdependence and coordination in business-to-business electronic commerce and supply chain management’, Information Technology and Management, Vol. 1, Nos. 1–2, pp.85–105.

Devaraj, S. and Kohli, R. (2003) ‘Performance impacts of information technology: is actual usage the missing link?’, Management Science, Vol. 49, No. 3, pp.273–289.

Devaraj, S., Krajewski, L. and Wei, J. C. (2007) ‘Impact of e-Business technologies on operational performance: The role of production information integration in the supply chain’, Journal of Operations Management, Vol. 25, No. 6, pp.1199–1216.

Du, T.C., Lai, V.S., Cheung, W. and Cui, X. (2012) ‘Willingness to share information in a supply chain: a partnership-data-process perspective’, Information & Management, Vol. 49, No. 2, pp.89–98.

Abdinnour-Helm, S., Lengnick-Hall, M. L., & Lengnick-Hall, C. A. (2003). Pre-implementation attitudes and organizational readiness for implementing an enterprise resource planning system. European Journal of Operational Research,146(2), 258-273.

Aladwani, A. M. (2002). An integrated performance model of information systems projects. Journal of Management Information Systems, 19(1), 185-210.

Altekar, R. V. (2005). Supply chain management: concepts and cases. PHI Learning Pvt. Ltd.

Al-Turki, U. M. (2011). An exploratory study of ERP implementation in Saudi Arabia. Production Planning and Control, 22(4), 403-413.

Bagchi, P. K., Ha, B. C., Skjoett-Larsen, T., & Soerensen, L. B. (2005). Supply chain integration: a European survey. International Journal of Logistics Management, The, 16(2), 275-294.

Bradford, M., & Florin, J. (2003). Examining the role of innovation diffusion factors on the implementation

success of ERP systems. International Journal of Accounting Information Systems, 4(3), 205-225.

Bradley, J. (2008). Management based Critical success factors in the implementation of ERP systems. International Journal of Accounting Information Systems, 9(3), 175-200.

Briolat, D., & Pogman, J. (2000, April). User involvement influence on project productivity in a rad environment: A quasi-experiment. In European Software Control and Metrics Conference, Munich.

Cai, J., Liu, X. D., Xiao, Z. H. and Liu, J. (2009). Improving supply chain performance management: A systematic approach to analyzing iterative KPI accomplishment, Decision Support System, 46(2):512.

Chan, C. K., & Lee, H. W. J. (2005). Successful strategies in supply chain management. Igi Global.

Chopra, S. and Miendl, P. (2005). Supply Chain Management. 3rd Edition, Pearson – Prentice Hall.

Craighead, C. W., Patterson, J. W., Roth, P. L., & Segars, A. H. (2006). Enabling the benefits of Supply Chain Management Systems: an empirical

study of Electronic Data Interchange (EDI) in manufacturing. International Journal of ProductioncResearch, 44(1), 135-157.

Davenport, T. H. (2000). Mission critical: realizing the promise of enterprise systems. Harvard Business Press.

Davenport, T. H. (1998). Putting the enterprise into the enterprise system. Harvard business review, 76(4).

Dezdar, S., & Ainin, S. (2011). Critical success factors for ERP implementation: insights from a Middle-Eastern country. Middle-East Journal of Scientific Research, 10(6), 798-808.