Influence of E-Business on Supply Chain Performance: Statistical Analysis on Indian Automobile Industries

Sumit Chandak *
Amit Chandak**
Avadesh Dalpati***

Abstract

Technology in changing continuously in and drastically. In order to achieve more profit and customer satisfaction it is mandatory to adopt E-Business Processes (EBPR) within Supply Chain Practices. In order to gain competitive advantages adoption of technological tools in Information Technology (IT) within Supply Chain Process (SCP) is required. Supply Chain practitioners must adopt advance technological tools in order to gain competitive advantage. In every Industry Supply Chain manager are in pressure to increase profit and satisfy customers. Therefore, adoption of E-Business Process and IT tools provide a key to Supply Chain managers to improve performance of Supply Chain and gain competitive advantage. Adoption of IT tools not only improve supply chain performance (SCPR) but also satisfy customers and reduce cost of SCP. Due to reduction in the cost product can reach up to customer with reasonable cost. Automobile Industries in India are growing continuously since last 2 decades and at the same time they are facing global competition day by day. Therefore, in order to complete globally they must provide products in reasonable price with tagged quality. Implementation of E-Business process in SCP will increase SCPR and provide competitive advantage specially for Indian Automobile Industries (IAI). Due to adoption of IT tools companies easily gain latest information within SP. This article analyses influence of EBPR on SCPR in context of IAI. Increase in Operational Efficiency, Inventory Management, Logistics performance, Supply Chain Flexibility, and Supply Chain Integration are tested as an independent variable. The result shows that Supply Chain performance is affected by using E-Business Process; there is an Impact of E-Business process on the performance of Supply Chain (Operational Efficiency, Inventory Management, Logistics performance, Supply Chain Flexibility, and Supply Chain Integration) of Indian Automobile Industries. This research also pointed out that the use of Information Technology tools and E-Business processes creates value in Supply Chain. In order to validate the survey is conducted on a target size of 172. Data is collected from the top and middle Supply Chain managers of selected Automobile companies of India. The study recommends that the objective of Supply Chain Management is to enhance operational efficiency, to achieve higher- order goals, better coordination among the entities of Supply Chain, to achieve better customer satisfaction and to gain competitive advantage in order to increase performance and enhance profit and this objective can be achieved by investigating the impact of Supply Chain management capabilities on performance of Supply Chain and assessing impact of E-Business process in performance on Supply Chain.

Keywords:

Supply Chain Management, E-Business Process, Information Technology, Supply Chain Process and Supply Chain Performance.

INTRODUCTION

It has been observed form last 20 years that contribution of India in global economy is significant. Lots of foreign direct investment (FDI) are coming in India since form

** Assistant Professor, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Ujjain Road, Indore, E-mail: sumichandak@gmail.com*
***Assistant Professor, IPS Academy, Institute of Engineering & Science, A.B. Road, Indore, E-mail: amit_2269@yahoo.com*
****Professor Shri Govindram Seksaria Institute of Technology and Science, 23 Park Road, Indore, E-mail: adalpati@gmail.com*

1991 due to changes in government policies. Government of India was adopted liberalization policies after 1991. Since from 1991 lots of mergers and investment came in India. Due to FDI lots of growth was seen in Indian industries. Due to these changes IAI grown significantly and India will become leader in automobile production in upcoming years. A revolutionary change has been seen in Indian manufacturing sector specially in IAI. But due to globalization in economy Indian companies are facing lots of competition and challenges and they are also looking toward large number of opportunities (OCED 2004).

Humphrey & Schmitz (2002) pointed out every organization are facing challenges continuously to gain competitive advantages to improve SCPR. Technology is increasing drastically therefore adoption of new IT tools is must for SC practitioner to gain competitive advantages. SCP of manufacturing industries are more complex as compared to service industries. If we compare SCP of different manufacturing industries SCP of automobile industries are much more complex because large number of components are required in vehicle manufacturing industries. Supply chain practitioners faces lots of global challenges. Cost of SC is huge in automobile industry therefore supply chain practitioners are facing lots of challenges to reduce cost so that vehicles can be manufactured at reasonable price with adequate quality. Local market of India is very huge therefore multinationals are looking towards Indian market. In coming decades there is ample opportunities in Indian Automobile Market. Due to entry of global players IAI are in continuous pressure. Therefor adoption of (EBPR) in SCP is required to achieve performance and gain competitive advantages. Upcoming century has created substantial prospects for IAI circular transversely the world also imposing competition on industries. In order to increase quality and operational performance incorporation of innovative features are required. Since last 20 years there is huge revolution in IT technology has been observed. This advancement of technology does not stop in near future and it will increase drastically. Therefore, adoption of EBPR in SCP with changes are necessary to absorb in SCP in order to gain competitive advantages and to enter in the global market. Since form last 20 years technology is changing rapidly and whole world was observing a massive uprising in computation and telecommunications and IT, and there are no calculations that this uprising will halt in a while, these quick fluctuations inspire front-runners amongst corporations to reflect of beginning greatest strategies to accept modification in knowledge in an effective manner in order to enhance the SCPR (Moayyad 2013). For most of the companies EBPR will act as a backbone int order to increase profit, achieve competitive advantages and satisfy customers. IT act as backbone for almost all companies because every company required right information on time with accuracy. "Getting the right information at the right time in order to improve the decision-making process is important at all levels within the organizational context" (Caldwell 2013). SCM amalgamated with logistics-activities in effective manner with the use of EBPR which leads to overall improvement of SCP. In order to increase cost-efficient logistic incorporation of EBPR in logistics process is must. So EBPR and IT tools must be adopted by companies and their SC practitioners to build a strong SC network and to improve overall SCPR (Fasanghari 2008). According to Sambamurthy 2003 innovative IT network and process was adopted by many successful companies for their upstream and downstream activities.

In present global market IAI are most demanding manufacturing industries. Adoption of EBPR will provide IAI a advantage to become world leader. Indian companies are needed to shift from traditional SCP to sustainable SCP. Therefore, adoption of IT and EBPR is must to become global player because not only manufacturing industries but customers are also shifting towards sustainability aspect.

STATEMENT OF PROBLEM

By adoption of EBPR & IT it was acknowledged to have a great consequence in Management of SC and a new perception among SCM practitioners to accept additional commanding and transformed SCM i.e. shift from traditional SCM to modernized technological SCP (Zhu 2004). In order to manufacture automobiles for multinational market continuously changing demand of the customer must full fill and it is mandatory to adopt complex and innovative design. Therefore, SC becomes more and more complex. In order to make these complex designs of SC effective and efficient and to meet challenges incorporation of EBPR is must. In order to gain profit from such a complex SC is very difficult and challenges. "Long order-to-delivery lead times, variable production schedules, surplus inventory across the supply chain, lengthy demand planning cycles and lack of visibility of suppliers required more and more attention and new direction to manage the things" (Chandak 2019). As the technology is changing drastically therefore coordination with suppliers are also changing and there must be

adoption of EBPR form both side company as well as supplier and there must be a two-way communication. Present economy is more innovative. Since last decades an exhaustive change in technology as well as in design has been observed. So, economy will differ additionally on understanding, IT, implementation of the new-design, creativity in the manufactured goods, personalized merchandise and local-services, worth supplement and imports and public-services, hostile promotion, clever tactics, and suppleness.

IAI need s raw-material from various suppliers. Adoption of smart manufacturing, Indusrty4.0 are must for IAI to compete in global market. "In the management of supply chain E-business process and use of information technology shown the enormous impact on the performance of the supply chain and build a strong network of relationship. E-business process and information technology used ERP, RFID, MIS, Mobile Technology, customized applications, supply chain management system (SCMS) in order to perform supply chain activities" (Chandak2019).

AIM OF RESEARCH

Purpose of this article is to create curiosity among the SC practitioners about EBPR. This article not only statistically validate results but also provide extensive literature for practitioners so that that can take advantage in order to improve SCP of their company. It has been observed that very few literatures are available in this field. Therefore, this article was initiated to create interest among Supply Chain practitioners about EBPR and IT. The idiosyncratic view-point recommended by scholars & specialists emphasized on EBPR & IT must be streamline SCP & processes via enhanced exchange method. Increasing implication of EBPR demonstrate significant amount article identified by E-SCM, articles associated to EBPR to SCP.

IAI is a foremost contributor to the economy of India as well as the world to some extent (Chandak 2019). There are continuous challenges on IAI from global bazar.

Primary Objective

The objective of this article is to establish the influence of EBPR on SCP of IAI.

Precise Objectives−

To ascertain the Influence of following parameters on the performance of Supply Chain of Indian Automobile Industries (Cost Reduction and Customer Satisfaction)

- To determine the impact of E-Business process on Operational Efficiency of Supply Chain.
- To determine the impact of E-Business process on Inventory Management of Supply Chain.
- To determine the impact of E-Business process on Logistics Performance of Supply Chain.
- To determine the impact of E-Business process on Supply Chain Flexibility.
- To determine the impact of E-Business process on Supply Chain Integration.

LITERATURE REVIEW

A systematic literature survey was conducted to determine influence of EBPR and IT on SCPR of IAI. Present paper scrutinizes influences of EPPR on SCP for IAI along with SC measurements and create a platform for SC practitioners and researchers to improve SCPR for IAI. There is a significant growth was observed in Indian Automobile sector since last 10 years. Many global players are looking towards Indian market. Many multinationals are keen to establish their plants in India due to cheaper labor cost and huge market. Proper Administration of SC & IT leads companies to expand their business in domestic and international market. In order to survive in global market supply chain practitioners must shift from traditional supply chain to sustainable supply chain (Chandak 2019). In order to maintain sustainability implementation and incorporation of EBPR and IT must be adopted by SC practitioners and companies must invest initially in technology so that they can gain competitive advantages. EBPR delivers a chance for businesses to contest successfully in the worldwide marketplace. "Due to advancement in the internet technology movement of data becomes faster at very low cost which leads to improvement in the performance of the supply chain. Consequently, the manufacturing sectors showing eagerness in developing the concept of e-Business"(Chandak 2019).

As per Auramo 2002; Golicic 2002; Gubi 2003 objective is to identify influence of EBPR on SCPR of IAI. Since form last 20 years it has been observed that SCP are molded more and more for lean approach to improve SCPR. Aim of which is to reduce over all cost of SC. Many Japanese techniques are used to improve efficiency & to reduce cost. "In light of this, in the last 2 decades has seen SCM practices developed toward more lean process approaches, in order to increase supply chain efficiency

(minimizing costs and eliminating inefficiencies), Concepts such as JIT; supplier base rationalization; outsourcing; virtual inventory; personalized and global networks; minimization of buffers in material, capacity and time; and minimization in the number of distribution facilities have led to improvements in performance of supply chain particularly in reducing costs lead to increase in profit"(Croom 2005; Intaher 2011).

SCM becomes a primary aspect for every organization in order to gain competitive advantage and to lead in global market because without efficient SCP no one can satisfy customers.

Supply chain management (SCM) has been noted as an increasingly important management field to help enterprises improve supply chain operations (Lynne 2007). Supply Chain Management incorporate movement of goods, movement of information, accounting, purchasing, Integration of producers, suppliers, logistics agencies and finally end users. Since last 20 years there is transformation from intra&inter organizational association towards modern business based long-run association which provide more and more flexibility which leads to gain more competitive advantages (Bensaou 1997; Scott 2000). Supply Chain Management reviewed a transformation & increasing enhancement that will enlighten as hidden development proposed to progress by and great effectiveness (Saad 2002). Apart from this educating the privileged efficiency of the corporation, the attention is on dropping excess and calculation of worth crosswise Supply Chain (Harland 1999).

Tan (2001) pointed out that SC managers are working towards improvement of inventory management and reduction of production cost and advancement of production planning and management of work in progress inventory and productivity at the end of 20th century. Gentjan Mehmeti pointed out that mechanisms of this prolonged mind fulness stayed the exhibition of Industrial Supply Development. Overview of IT and EBPR validates this. In the mid of 1990 growth of SC improved owing to the development of newfangled device Enterprise resource planning that willpower growth purchaser and contractor connection. Movahediet 2009 pointed, "while EDI - Electronic Data Interchange systems were concerned mainly with inter-organizational integration, ERP systems were a concern mainly with intro - organizational integration ". GentjanMehmeti "evolution continues in the 21st century with the development of more sophisticated IT systems (internet - based solution systems), which are concerned for both inter-organizational integration and intra-organizational integration. Moreover, the relationship buyer-supplier in this period have gone one-step forward, from normal partnership to long-term relationship and strategic alliances". In the starting of 20-century idea procedures & processing of assemblage was happening that centrals idea of build making. It will shorten delivery lead time. As manufacturing and technical progression advancements member of staff period and period of merchandises drive decreases noticeably. Idea of slender work, MMRP, ERP, JIT dramas a chief role in administration of SC everywhere at the end of 19 Century. Appropriate Rheostat of Inventory diminishes quantity of investment investment and elasticity in SCP (Womack, 1990.)

Due to the emergence of Technology Automobile companies are facing high competition in the current era. Due to this situation, many companies are adopting mergers and acquisitions policies for their survival. To remain in market Auto manufacture has to concentrate on some objectives. These objectives are mainly cutting of cost, improvement in quality, customer satisfaction, timely delivery, and improvement of after-sales service, use of technology, use of communication system, improvement in productivity, and improvement in quality. "Supply Chain Management (SCM)" remarkable role to achieve such goals in order to meet sever competition faced by manufacturer and suppliers.

RESEARCH MODEL

Present market of IAI is shifting from domestic to multinational. In order to compete in the market IAI has to produce vehicles as per changing customer demand. Demand of young population is changing drastically and in order to meet ever changing demand of customers manufacturing companies required rapid changes in the design of vehicles and their parts. Due to this changing in demand SC of automobile sector becomes more and more complex. In order to over this complexity adoption of EBPR and IT tools is necessary. Life cycle time of vehicles become lesser in present scenario. So SCM managers required to pay consideration in Administration of SCP in order to achieve long as well as short term objectives of organization. To continue in marketplace SCM developed thought-provoking occupation intended for maximum companies (Christopher, 1998). There is requirement of development of modern production planning in product line in order to achieve developed construction through better-quality production through subordinate charge & improved superiority of goods. Businesses take to growth additional attention on contemporary geographies of the

automobile. Some contemporary topographies exist as shadows.

1. Color of Automobile & Superiority of color.
2. Build strategy of the Automobile.
3. Engrained Security structures in the automobile.
4. Internal of Automobile.
5. Acoustic and Cinematic organizations.
6. Control opening arrangement.
7. Engrained GPS Knowhow.
8. Additional luxury in Suspension Arrangement.
9. Hydraulicly straddling apparatus to diminish machine all-encompassing.
10. Hydrographical openings.
11. Back television camera for contrary and informal bays.
12. Range pointer.
13. Automobile Path possession.
14. Car parks Instruments etc.

Above topographies essential for additional complication in Organization SC since SCP takes to agreement through countless automobile supplementary contractors. Beforehand procuring an automobile buyer is undertaking masses of investigate and investigation. Therefore, :companies are trying to match most of the demand of customer by giving most of the necessary features in minimum price as per segment of vehicle. For an Automobile thousand of parts are required. Figure 1 shows the generalized supply chain of an Automobile Industry" (Chandak 2019).

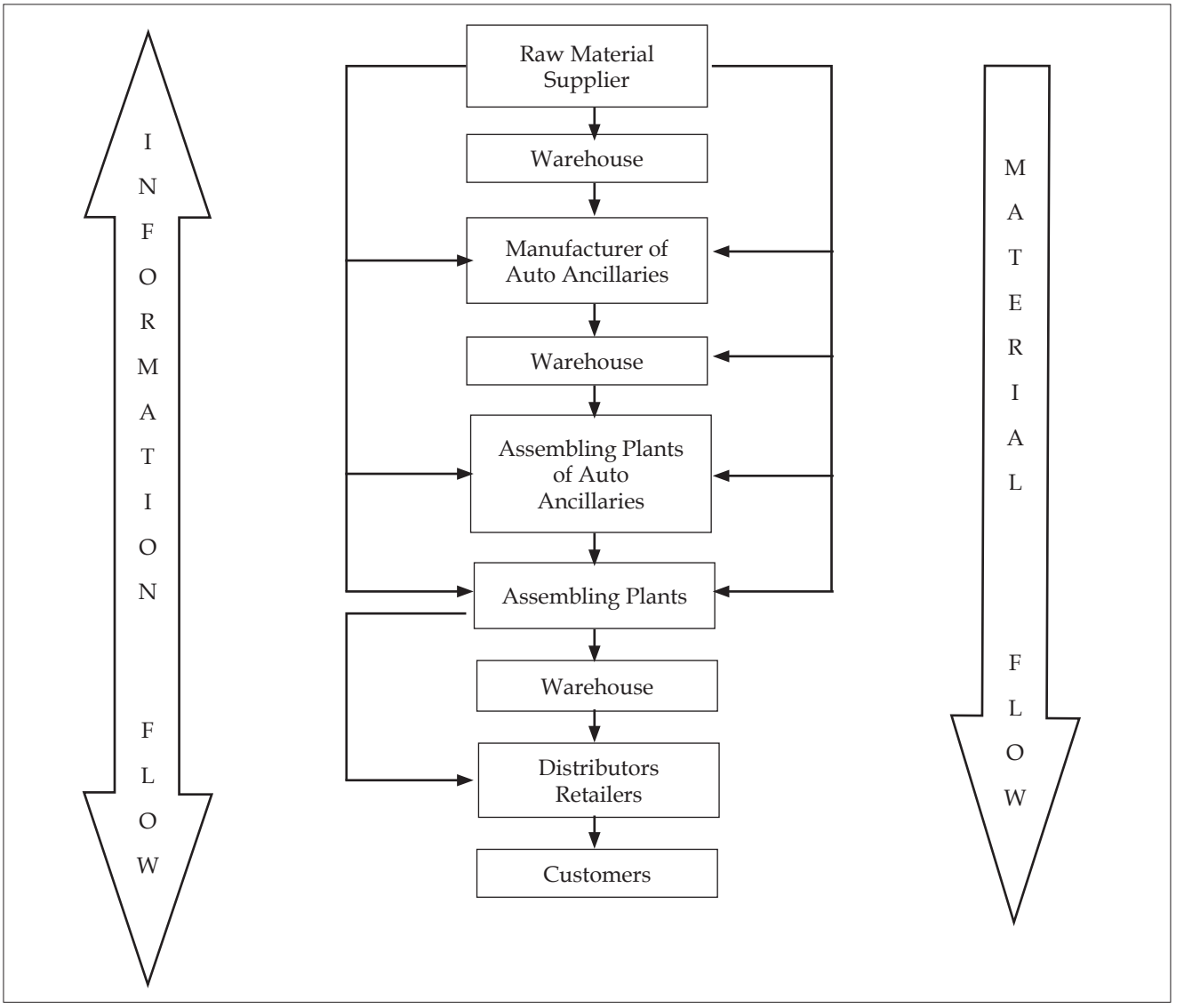

Figure 1: Generalized Supply Chain of Automobile Industry (Chandak, 2019)

Figure2 represents theoretical prototypical that insides SCP equally supported inconstant (Cost_Reduction and Customer_Satisfaction) & autonomous inconstant involve five restrictions (Operational_Efficiency, Inventory_ Management, Logistics_Performance, Supply_Chain_ Flexibility, Supply_Chain_Integration) to legalize study. Present prototypical elasticities strong assembly of recital amount finished original arrangement victimization greatest observes. Present background is secondhand to investigate the influence of EBPR on the presentation of SCP for IAI. Cost_Reduction & Customer_Satisfaction stand occupied restriction to quantity SCP. Presented prototypical willpower benefit in reformation for progress of SC & offers an explanation for upgrading development of SC. "Fundamentally this research aims to investigate the operational performance of E-business processes, information technology tools by comparing E-business and pre-e-Business tools practices in supply chain management (SCM) in Indian Automobile sector through a systematic approach" (Chandak, 2019).

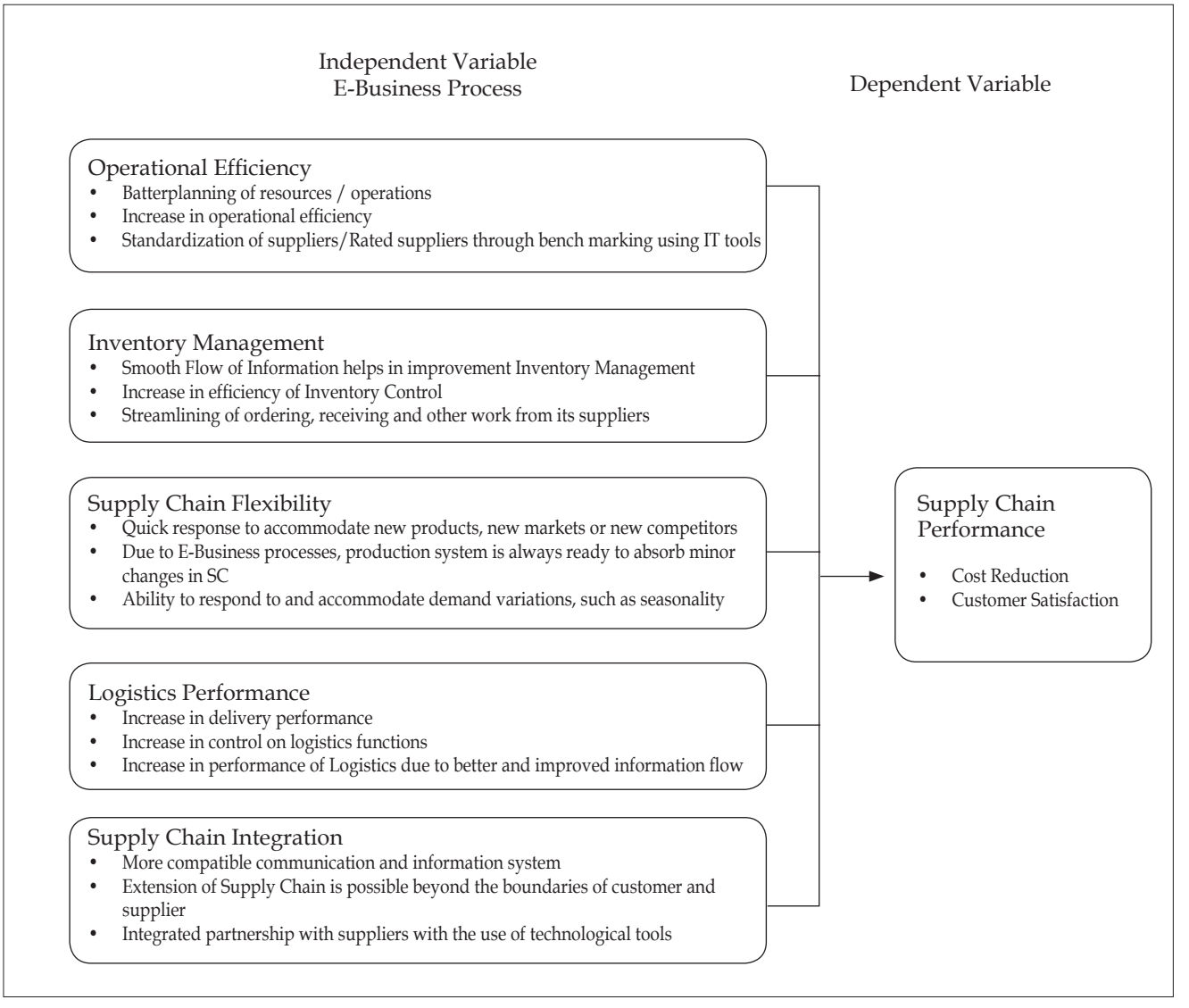

Figure 2: Conceptual Frame Work (Chandak, 2019)

Research Questions

- What is the impact of Inventory Management on Supply Chain Performance using E-Business - Process?
- What is the impact of Supply Chain Flexibility on Supply Chain Performance using E- Business - Process?

- What is the impact of Logistics Performance on Supply Chain Performance using E-Business - Process?
- What is the impact of Supply Chain Integration on Supply Chain Performance using E-Business - Process?

METHODOLOGY

Present article examine & establish inspiration of EBPR on SCP in the context of IAI by means of expressive investigate strategy. Present article is grounded on investigation of information composed after a investigation which is created on the feedback form respondents as a tool of information gathering in direction to display the influence of EBPR on SCP on IAI. This is supported by (Gall et al, 2003) who state that this category of proposal sanctions one to become data with satisfactory correctness so assumption can be verified in an suitable method.

Population and Sample

On the basis of the literature survey, conversation through professionals, questioning through SC professionals & IT professionals authentication investigation survey is completed. Information are composed as of SC Administrators & their assistants (Total 120) employed as middle_level administrators of Nominated IAI. Available of a populace magnitude of 180, we received a total of 120 replies through the rejoinder proportion of nearby 66.66%. Answers are composed since a specific mark set of respondents, consequently, the specimen process castoff is goal-directed.

Measures

Five-point Likert scales were used to measure all parameters.

Likert Scale :

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

Statistical Methods

To complete the purposes of study investigation of expressive digits exist supported obtainable through SPSS22 on behalf of the examination information composed by organized opinion poll. These descriptive statistics mainly contents mean, standard deviation and frequency distribution. To envisage the association amongst inconstant & outlooks between features underneath the investigation Deterioration representations is cast-off. In this article 5 autonomous variable quantity (Functioning Competence, Record Administration, Logistics Presentation, SC Elasticity, and SC Incorporation) are cast-off & their connection by the supported inconstant (SCP) is investigated by numerous deterioration investigation.

Following deterioration prototypical is secondhand for this investigation.

$Y= \beta0 + \beta1X1 + \beta2X2 +\beta3X3 +\beta4X4 + \beta5X5 + \varepsilon$

Where: X1 = Functioning Competence; X2= Record Administration; X3 = Logistics Presentation; X4 = SC Elasticity; X5 = SC Incorporation; e = Fault stretch; $\beta0$ = Persistent; $\beta1$- $\beta5$ = Deterioration constants (modification encouraged in Y by individually X).

RESULTS AND DISCUSSION

Correlation Analysis

Inferential statistics Pearson's product moment correlation analysis was used for the investigation of research variables. To examine the association amongst study inconstant, Pearson's product moment correlation utilized since in the survey an assessment gauge cast-off. This article examined over association examination which shows robust connection amongst Functioning Competence and SCP, somewhere the association constant remained 0.900 and p-cost of 0.000. Investigate likewise recognized that nearby a constructive connection amongst Record Administration and SCP through association constant of 0.889 and p-cost of 0.004. Investigate likewise explore that nearby a constructive

connection amongst Logistics Presentation SCP through the association constant of 0.885 and p-cost of 0.000. Investigate additional explore that nearby an optimistic association amongst SC Elasticity and SCP with a correlation coefficient of 0.900 and p-cost of 0.000. At last, investigate institute that nearby an optimistic connection concerning SC Incorporation and SCP through a association constant of 0.903 and p-cost of 0.000.

Table 1: Correlation of the study variables

		Supply Chain performance	Operational Efficiency	Inventory Management	Logistics Performance	Supply Chain Flexibility	Supply Chain Integration
SCP	Pearson Correlation	1					
	Sig. (2-tailed)						
Functioning Competence	Pearson Correlation	.900**	1				
	Sig. (2-tailed)	0					
Record Administration	Pearson Correlation	.889**	.913**	1			
	Sig. (2-tailed)	0.004	0				
Logistics Presentation	Pearson Correlation	.885**	.730**	.927**	1		
	Sig. (2-tailed)	0	0	0			
SC Elasticity	Pearson Correlation	.900**	.832**	.911**	.855**	1	
	Sig. (2-tailed)	0	0	0	0.001		
SC Incorporation	Pearson Correlation	.903**	.832**	.911**	.855**	.9021**	1
	Sig. (2-tailed)	0	0	0	0.001	0	

Regression Analysis

To regulate the connection amongst SCP & 5 self-governing variables, a manifold deterioration investigation was directed. The deterioration prototypical cast-off for study was;

The deterioration prototypical was; $Y = \beta0 + \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4 + \beta5X5 + \varepsilon$.

Whereby:

$\beta0$ = Constant;

$\beta1$- $\beta5$ = Regression coefficients (change induced in Y by each X);

Y is the dependent variable (Supply Chain Performance);

X1 = Functioning Competence

X2= Record Administration

X3 = Logistics Presentation

X4 = SC Elasticity

X5 = SC Incorporation

e = Fault span

SPSS22 was used for dimension of multiple deteriorations aimed at the study. The variations in the sovereign flexible resolve touch the reliant adjustable up to that gradation or proportion of disparity will be elucidated by the amount of fortitude. 5 sovereign variables secondhand for study explained that 91.9 % of SCP in the background of IAI as embodied by familiar R rectangular. This specifies that other adjustable or strictures that is not intentional by this study underwrite 9.2 % of EBPR on SCP in the context of IAI.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate
1	.911[a]	.822	.833	.37
a. Predictors: (Constant), Functioning Competence, Record Administration, Logistics Presentation, SC Elasticity, SC Incorporation				

On the base of table 5 that is fashioned by SPSS22 tool the calculation

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \varepsilon$

Suits

Y= 0.029X1+ 0.056X2+ 0.005 X3+ 0.351 X4 + 0.0.24 X5 +17.669

Table 3: Deterioration Constants

Model B		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		Std. Error	Beta			
1	(Constant)	18.79	9.2		1.9	.070
	Functioning Competence	.030	.031	.066	1.051	.029
	Record Administration	.060	.030	.131	1.800	.080
	Logistics Presentation	.0049	.333	.001	.031	.099
	SC Elasticity	.361	.035	.800	15.263	.000
	SC Incorporation	.025	.054	.033	.641	.068
a. Reliant Variable: SCP						

self-governing inconstant converts nothing afterward the conceivable cost of Y is 18.79. The Statistics outcomes likewise studied that through possession all self-governing inconstant nil, SCP will upsurge by 0.30 on a component upsurge Functioning Competence. This displays nearby is a noteworthy connection amongst Functioning Competence & SCP since p-value is 0.029.

The Statistics consequences also studied that by possession all autonomous inconstant nil, SCP will upsurge by 0.060 on a unit upsurge in Record Administration. This demonstration nearby is a noteworthy connection amongst Record Administration and SCP since p-cost is 0.080.

The Statistics consequences also examined that by possession all self-governing inconstant nil, SCP will upsurge by 0.0049 on a unit rise in Logistics Presentation. This demonstrations there is a noteworthy connection amongst Logistics Presentation and SCP since p-value is 0.099.

The Information consequences also examined that by possession all self-governing inconstant null, SCP will upsurge by 0.361 on a unit rise in SC Elasticity. This displays there is a substantial connection amongst Supply Chain Flexibility SC Elasticity and SCP since p-value is 0.000.

In the end, the Information consequences also studied that by possession all self-governing inconstant null, SCP will increase by 0.025 on a unit rise in SC Incorporation. This displays there is a noteworthy affiliation concerning SC Incorporation and SCP since p-value is 0.068. This shows that SC Elasticity disturb the SCP maximum tailed by Record Administration, Functioning Competence, SC Incorporation, and Logistics Presentation.

CONCLUSION

Supposition of this article is to examine influence of EBPR on SCP for IAI through numerous verdicts. On the basis of historical involvements, the mechanisms of the EBPR remained depend to have a confident impression on the SCP on IAI. Conclusion since study opinion available that nearby is a momentous confident connection amongst the restrictions of SC that is Functioning Competence, Record Administration, Logistics Presentation, SC Elasticity, SC Incorporation with SCP on IAI. The study likewise displays that EBPR is appropriately cast-off by IAI to advance SCP. This study based on EBPR as the zone of examination and attention on EBPR and practice of IT tools in SCM that has expanded noteworthy consideration in current centuries. Present study is imperfect to the Influence of EBPR on presentation of SCM of IAI. Though, this study on a baggier measure specially through esteems to the grouping of organizations through additional SC associates for leisurelier statistics and data allocation is desirable.

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