Evaluating the Effect of Digitalization on the Sales Force of Pharmaceutical Industry

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A R T I C L E   I N F O

A B S T R A C T

Digitalization is altering the processes and the comportment of many industries. Sales Force Automation (SFA) tool is designed to enable and assist the Sales Executive of the Pharmaceutical industry. This study empirically examines the Deleon and McLean Information System (IS) success model in the Indian Pharmaceutical Industry to access the impact of SFA tool on the performance of the Sales Executives. The proposed ICT Success structure included six aspects (System-Quality, Information-Quality, Service-Quality, User-satisfaction that measure the SFA systems success which is the Individual-Impact). Multivariate regression data analysis technique was used for the analysis. Empirical results denote that variables User-satisfaction, Information-Quality, and Service-Quality are strong predictors of Individual-Impact, whereas User-satisfaction is negatively related to Individual-Impact. This supports the findings of (Sharif, K., 2008) a study of the United Kingdom Pharmaceutical industry proved that the thrust of Digitalization was more data-centric and not customer centric. The Sales executive perceive that SFA tool is not so useful when sales pitch needs to be customized to service different customers (doctors).

1. Introduction

Due to global proliferation, outsourcing, innovative media and communication modes the contemporary customers is more cognizant and arduous. This is leading to competitive pressures and every organization is trying to gear up and create competitive improvement. To compete in such a dynamic environment, enterprises are discovering the covert value in enterprise business solutions and e-enabling their internal structures. On the other hand, India-Vision 2020 is a vision of IT for the masses. The Ministry of Communication and IT has plans for the all-inclusive growth of digital literacy. The objective is to put the Indian society to grasp and become technology prepared for the upcoming ICT tools (Manas Bhattacharya, Vision 2020). This brings us to question about how the employees in various industries and organization are adapting to use the ICT tools and is it improving their performance.

The Healthcare sector of India is one of the fastest developing sectors and is anticipated to progress at a CAGR of 17% and is expected to reach 250 USD by 2020 (IBFE Pharma, August 2015). This growth is accredited to the rise in the domestic consumption owing to surge in the health awareness, preventive health care measures and prevalence of lifestyle diseases in India. National production is also playing a big role as India has low-cost production advantage and the exports market is profitable. The Indian pharmaceutical industry, which has a present market size of $27.57 billion (as reported last in 2016), is predicted to touch approximately $55 billion by 2020 at a CAGR of 15.92%, as per the report by Indian Brand Equity Foundation (IBEF). Budget Sectoral point of view after the Budget presentation (KPMG, Union Budget 2016, Pharmaceutical) states that Government of India has initiated an ambitious 'Make in India' program, and the pharmaceutical sector is among the list of the important 25 sectors identified by them. Government deliberation will offer the needed push to this industry to grow at an accelerated rate.

New domain of science incorporates applications of IT systems in pharmaceutical industry. One of them is Sales Force Automation (SFA). SFA is implemented by many companies for facilitating their Sales Force task achievement (Manjramkar, J. 2016). SFA System is an application of digital and wireless technologies for personal selling. It is a Customer Relationship Management System which enables the sales representatives to manage, and supports them in performing their sales tasks (Zikmund, W. G., McLeod, R., & Gilbert, F. W. 2003). SFA system consist of a contact administration system which traces, tracks and stores all the contact and interactions that are made with the customers, it registers the purpose and reason regarding the meeting and reminds for follow up to me made if needed. This guarantees that the sales attempts and

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efforts are not repeated, reducing the chances of unnecessarily annoying the customers. Another module of SFA has lead following system, which stores the entire list of potential clients, which can be sourced through a paid repository service provider. Other elements of the SFA system contain sales forecasting, order management, follow up management, analysis and reporting tool and product knowledge.

2. Literature review

DeLone and McLean presented an outline for measuring the impact of Digitalization and Automation system (Delone, W. H., & McLean, E. R., 2003). Their study deliberates about many important IS success research publications focusing on studies that have investigated the model application, validation, and the proposed enhancements to the original frame (Petter, S., DeLone, W., & McLean, E., 2008). 180 papers containing IS success in the academic literature were reviewed by the researchers from the period 1992 to 2007. They further scrutinized 90 empirical studies across numerous geographies which used the (DeLone & McLean) D&M model. This model in its setting has six facets, system-quality, Information-Quality, Service-Quality, use, User-satisfaction, and net benefits. To evaluate the success of the information system application the relationship between these variables is examined. They found the proposed DeLone and McLean Model was best possible model for evaluating utilitarian Information System accomplishment.

(McGill, T ,Hobbs ,V.,& Klobas, J. 2003) in their study used a altered Delone and McLean framework to understand the effect of Digitalization in the Australian market. They operationalized the model to analyze the association of utilization of ICT by sales representatives and its effect on their customers and on their internal relationship within the organization. The results specified that impetus of Digitalization was basically data centric instead of being customer centric. This paper highlights that Sales Personnel/human resource is the most important factor in the organization achievement of strategic goals and if Digitalization is implemented without focusing on the strategic objectives will prove to be futile.

An interesting study in New Zealand highlights the application of ICT has changed the nature of work of majority of Labor force from advancing to decent work (results impacting) from laborious and mundane work (Stephen B.Bluemenfeld and Glen Thickett Feb 2003). New Zealand government has designed and implemented a Comprehensive Policy to introduce Information and Communication Technology (ICT) in education through NFQ (A National Qualification Framework). ICT education has developed majority of Labor force by engaging in Knowledge, Skill, Technology, Innovation, Productivity and Entrepreneurship. This study suggests that ICT application should result in the benefiting in enabling the users to advance to decent work from laborious and mundane work and 'Decent Work' should be one of the important output parameters.

A cross country analysis of Germany, England and United States was done to understand the relationship between the performance of the users/employees and their beliefs and usage of the SFA system. The results showed significant difference in their usage, beliefs and performance within the countries (Robert L. Engle, Micheal L. Barnes, 2000). This study highlights the differences in the perception towards digitalization and its applications in different geographies. The researchers did an in-depth analysis to find out the assistance the sales force requires from any automation initiative. This study provides the output/benefits expected and to be measured from the use of SFA by the Sales Force of any organization. The basic requirements were support to map and plan the sales area allotted to the sales executive, accessibility to product, market and competition information, communication with the company. A study of the Taiwan market (Cheng-wu Chen, Chun-pin Tseng, King-ling Lee and Han-chung Yanf, 2011) deliberated the relationship between each productivity parameter of the system with the personality traits of the sales personnel/medical representative. The findings indicated that the different employees of the sales force function had a different experience and opinion of the system after using the SFA system. The study directs to consider the personality traits of the sales force while measuring their satisfaction with the system use.
Overall the literature review conveys that the DeLone and McLean Model is a very well tried and tested model all over the world to assess the Information System (IS) success. The literature guides to formulate and operationalize the model for this study and helps to define the items of the variables to be included in this study.

3. Research Problem Statement
3.1. Research Questions
Has the employees' performance enhanced by implementing ICT services?
Has Digitalization resulted in organization benefit?
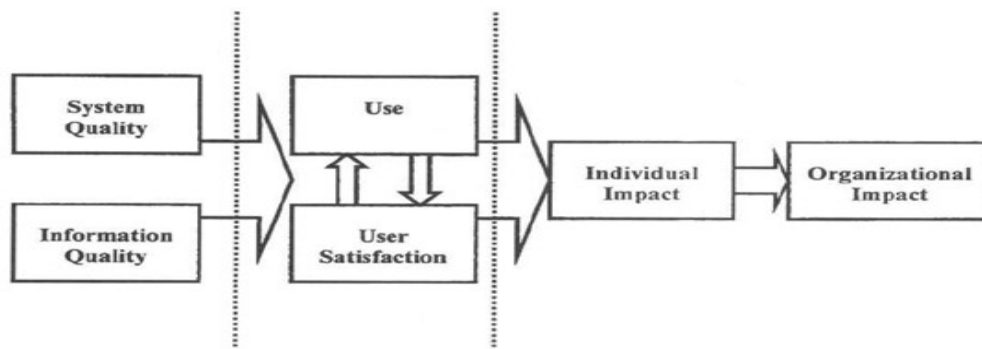
3.2. Theoretical Framework

Figure 1- DeLone and McLean IS system Model

DeLone and McLean proposed a theory comprising of six essential elements. The theory proposes that comprehensive understanding of Digitalization effects can be obtained by studying the relationship between the proposed six aspects of the framework. These six fundamental aspects are system-quality, Information-Quality system use, User-satisfaction and net system benefits.

Many scientists have challenged this model and enhanced it further by additions and alterations (DeLone, W. H., & McLean, E. R.2003), and this is one of the number one persuasive theories in the existing information systems research. The updated frame brings in additional factors and suggests Quality will have one more dimension, 'Service-Quality'. The 'System Use' or 'Utilization' is dependent on the environment where it is used. In an organization setup, the Digital tool is used by the employees; here the use of the tool is mandatory. In the case where the Digital tool is offered as a service and channel of access to the user, the 'System use' is not mandatory and is dependent on the profile of the user (Polasik, M., & Piotr Wisniewski, T., 2009). In this study 'System Use' is not considered in the construct as using the SFA tool is mandatory for the Sales executives (employees) in the Pharmaceutical industry.
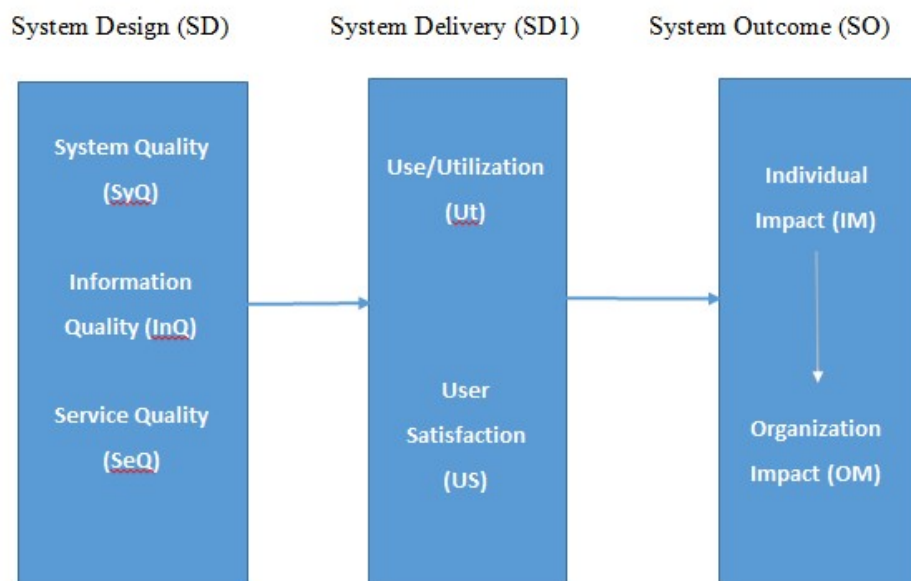

Figure 2- Formulated Model for the study

3.3. Variables

Based on the theoretical framework, the user profile and the pharmaceutical industry in this study the following are the variables defined.

Independent

i. System-Quality- Users will be show confidence in using any automation system if they have the confidence that it is designed to assist them and factored their challenges of accomplishing their task. System-Quality measures the desired characteristics of ICT System designed for the users. This is measured by systems Robustness, Flexibility and Adaptability.

ii. Information-Quality- Information-Quality captures the ICT content matter. It measures the quality of the information provided by the system. These factors include availability of current and past reports, accuracy of

the reports, updating relevant and periodic reports, new product information and easy to understand format of the reports.

iii. Service-Quality- Service-Quality is the overall sustenance delivered by the provider of service. Ease of navigation, responsiveness of the system and providing complete information are its measures.

iv. Use / Utilization- It is measured by the frequency of use of the system. When a system is used in an organization by its employees, its utilization is mandatory irrespective of the users' choice and interest. A study of Poland market suggest that Use of the system is a function of the users demographic profile (Polasik, M., & Piotr Wisniewski, T, 2009). In this study this variable will not be measured as the system use is mandatory and its measure will not represent user's interest and choice.

v. User-satisfaction- User-satisfaction is measured by the users' perception, about the system being helpful to them in performing their task and making them more competent, training imparted being useful to operate the system, encouragement provided by management to use the system, improvement in the quality of the work content and does it provide more spare time to achieve work life balance.

vi. Dependent

vii. Individual-Impact- In this study the Users is the front-end Sales executive of the organization. It is measured as the Users perception of the system. Does it assist them in improving their 'productivity' and 'effectiveness'? Has the nature and quality of their work improved from mundane and routine task to important work, which is articulated as 'decent work'.

viii. Organization-Impact- Is measured as the Users perception of the improvement in the Organizations 'Cost Savings', 'Revenue performance', 'Customer response time' and 'Brand/Corporate image' due to the use of the ICT system.

3.4. Hypotheses

a. IM = f (SyQ, InQ, SeQ, US)

b. OM = f (SyQ, InQ, SeQ, US, IM)

Where SyQ: System-Quality, InQ: Information-Quality, SeQ: Service-Quality, US: User-Satisfaction, IM: Individual-Impact, and OM: Organization-Impact.

H1: The dimensions System-Quality and Individual-Impact have no relationship

H2: The dimensions Information-Quality and Individual-Impact have no relationship.

H3: The dimensions Service-Quality and Individual-Impact have no relationship.

H4: The dimensions User-Satisfaction and Individual-Impact have no relationship.

H5: The dimensions System-Quality and Organization-Impact have no relationship.

H6: The dimensions Information-Quality and Organization-Impact have no relationship.

H7: The dimensions Service-Quality and Organization-Impact have no relationship.

H8: The dimensions User-Satisfaction and Organization-Impact have no relationship.

H9: The dimensions Individual-Impact and Organization-Impact have no relationship.

4. Research Design and Methodology

A survey was conducted by administrating a structured questionnaire capturing the responses on a 5-point Likert scale, among the Sales Executives/ Medical Representatives of Pharmaceutical companies using ICT (SFA) systems in their organizations in Mumbai region. Non-probability convenience sampling method was adopted. 310 Sales Executives/Medical Representatives, working in different organizations in Pharmaceutical sector in Mumbai city using the SFA application.

Instrument validity was checked using Factor Analysis, Reliability using Cronbach's Alpha, and Descriptive statistics to describe the demographic profile of the sample which represents the population of this study. The results of the survey were analyzed using a multivariate regression analysis.

5. Empirical Results

5.1. Instrument validity using Factor analysis

Kaiser Mayer Olkin (KMO) statistics was used to examine the appropriateness of factor analysis. Value greater than or equal to 0.5 were considered as acceptable. Bartlett test of sphere-city was used to test the whether the items defining the construct are un-correlated (Malhotra, N.K.2011. Marketing Research.

Table 1- Independent Variable

KMO and Bartlett Test

	SyQ	InQ	SeQ	US
KMO measure of sampling adequacy	0.918	0.935	0.892	0.903
Bartlett test of sphere-city (chi-square)	1515.3	3024.92	1111.07	1091.66
Df	36	78	10	55
Sig.	0	0	0	0
Factor Analysis -Component Matrix	All the items of System-Quality loaded on one single factor.	The items loaded on 2 factors but the loading on the first factor was high. All the items of Information were accepted as all of them loaded on factor 1 above the cut-off value of 0.5.	All the items of Service-Quality loaded on one single factor.	The items loaded on 2 factors but the loading on the first factor was high. All the items of User-satisfaction were accepted as all of them loaded on factor 1 above the cut-off value of 0.5.

Table 2 – Dependent Variable (Individual Benefit)

KMO and Bartlett's Test

	Productivity	Effectiveness	Decent Work
KMO	0.82	0.83	0.86
Bartlett test of sphere-city (chi-square)	803.407	1612.75	1609.62
Df	36	55	10
Sig.	0	0	0
Factor Analysis- Component Matrix	Two items (Productivity 1 and Productivity 10) were dropped as they did not make it to the cut-off value of 0.5. All the items of Productivity loaded on one single factor.	Four items (Effectiveness 8 to 11) were dropped as they did not make it to the cut-off value of 0.5. All the items of Effectiveness loaded on one single factor.	All the items of Decent Work loaded on one single factor.

Table 3 – Dependent Variable (Organization Benefit)

	Revenue Performance	Cost Saving	Customer Response Time	Brand Image
KMO	0.5	0.883	0.723	0.5
Bartlett test of sphere-city (chi-square)	176.915	1549.32	352.449	373.46
Df	1	36	3	1
Sig.	0	0	0	0
Component Matrix	All the items of revenue performance loaded on one factor.	All the items of cost saving loaded on one factor.	All the items of customer response time loaded on one factor.	All the items of brand image loaded on one factor.

Bartlett test of sphere-city is significant as p value is less than 0.05 and KMO value is greater than equal to 0.5, we infer that the items used to define the independent variables are valid.

5.2. Reliability Test – CronBachs'Alpha

Table 4

Variable	No of items	Valid Cases	Cronbach's Alpha
System-Quality	9	310	0.91
Information-Quality	13	310	0.946
Service-Quality	5	310	0.92
User-satisfaction	11	310	0.863
Individual-Impact	21	310	0.892
Organization-Impact	16	310	0.871
Overall Reliability	75	310	0.943

The Cronbach's Alpha scores show consistency among the number of items built to collect the actual results. All the values of all the variables are inclining to 1. The scale is reliable.

5.3. Demographic of the Sales Executive of the Pharmaceutical Industry

Descriptive statistics of the System User is representative of the sales force profile of the front-end sales executives of the organizations in the Indian Pharmaceutical Industry. Majority of them (83.2%) are younger than 35 years of age, 85% of them are Males, education qualification wise they predominantly just 12th grade (71%) and one-fourth of them are graduates. Almost half of them (54.8%) have 3-5 years of work experience and most of them (91.6%) earn less than 7lacs.

5.4. Model Fit

Regression analysis (Malhotra, N.K.2011. Marketing Research).

Table 5- Multiple Regression Model Summary for IM = f (SyQ, InQ, SeQ, US).

Model	R	R-Square	Adjusted R-Square	Standard Error of Estimate
	0.648	0.42	0.412	0.67789
Predictors - Constant, System-Quality, Information-Quality, Service-Quality, User-satisfaction				

R value is 0.648, which indicates the correlation between the IM and its SyQ, InQ, SeQ and US. Rsquare (coefficient of determination) value is 0.42, infers that percentage of variance of Individual-Impact explicated by the System-Quality, Information-Quality, Service-Quality and User-Satisfaction.

Table 6 Analysis of Variance

Model	Sum of Squares	DF	Mean Square	F Statistics	Significance
Regression	101.463	4	25.366	55.2	0
Residual	140.157	305	0.46		
Total	241.62	309			

Analysis of Variance gives p-value of less than 0.1, which indicates model fit. The model results in a significant good degree of prediction of the dependent variable, the Individual-Impact.

Table 7-Coefficients, Dependent Variable- Individual-Impact

Model	Co-efficient	t	Significance
Constant	4.762	17.96	0
User-Satisfaction	-0.684	-8.949	0
System-Quality	0.048	0.596	0.55
Information-Quality	0.233	2.104	0.04
Service-Quality	0.141	1.753	0.08

The factors that contribute mainly to the IM are US, InQ and SeQ. The p-value of SyQ is more than 0.1 which implies that System-Quality does not influence the Individual-Impact significantly. The constant has p-value less than 0.1, so it is significant in this case.

$$IM = 4.762 - 0.684\ US + 0.233\ InQ + 0.141 SeQ$$

To measure the overall impact of five predictor variables on the Organization-Impact, the data was subjected to Multiple Regression Analysis.

Table 8- Multiple Regression Model Summary for OM = f (SyQ, InQ, SeQ, US, IM)

Model	R	R-Square	Adjusted R-Square	Standard Error of Estimate
	0.874	0.764	0.761	0.43041
Predictors - Constant, Individual-Impact, System-Quality, Information-Quality, Service-Quality, User-satisfaction				

R value is 0.847, which indicates the correlation between OM and dependent variables IM, SyQ. InQ, SeQ, and US. RSquare value is 0.764, implies that 76.4% of variance of Organization-Impact is explained by the predictor variables Individual-Impact, System-Quality, Information-Quality and Service-Quality and User-Satisfaction.

Table 9- Analysis of Variance

Model	Sum of Squares	DF	Mean Square	F Statistics	Significance
Regression	182.732	5	36.546	197.282	0
Residual	56.316	304	0.185		
Total	239.048	309			

Analysis of Variance gives p-value to be significant as it is less than the critical value of 0.1, so the model results in a significant good degree of prediction of the dependent variable, which is Organization-Impact.

Table 10- Coefficients, Dependent Variable- Organization-Impact

Model			
	Co-efficient	t	Significance
constant	0.275	1.141	0.26
User-Satisfaction	-0.122	-2.241	0.03
System-Quality	0.11	2.16	0.03
Information-Quality	0.303	4.27	0
Service-Quality	0.081	1.571	0.12
Individual-Impact	0.51	14.04	0

High B-Coefficients indicates that factors "Individual-Impact", "Information-Quality", "User-Satisfaction" and "System- Quality" contribute to "Organization-Impact". The p-value of Service-Quality is greater than the critical value 0.1, implies that Service-Quality has no significant influence on Organization-Impact. The constant is also insignificant here.

$$OM = 0.275 + 0.510\ IM + 0.303\ InQ - 0.122\ US + 0.110\ SyQ$$

Table 11- Inference for SFA impact on the Sales Employees of Pharmaceutical companies.

Hypothesis	p value	Inference
H1	0.552	Accept
H2	0.036	Reject
H3	0.081	Reject
H4	0	Reject
H5	0.032	Reject
H6	0	Reject
H7	0.117	Accept
H8	0.026	Reject
H9	0	Reject

6. Discussions, Implications & Direction for future research

Empirical results imply that variables User-Satisfaction, Information-Quality, and Service-Quality are strong predictors of Individual-Impact. The effect of System-Quality on Individual-Impact is insignificant. It is observed that User-satisfaction is negatively related to Individual-Impact.

System-Quality (robustness, flexibility, and adaptability) is not a strong predictor of Individual-Impact. It can be inferred that Sales executives perceive them as hygiene factors and not motivators to influence their productivity, effectiveness and quality work. User-satisfaction with the system is negatively related to the Individual-Impact. This supports the findings of the literature by (Sharif, K., 2008), which is a study of the United Kingdom Pharmaceutical industry. The study proved that the thrust of Digitalization was more data-centric and not customer centric. Implementation of Digital tools in the correct way is very important as sometimes the ends get ignored with too much focus on the means. It can be inferred that ICT systems were not so useful when highly customized products and customers (doctors) were required to be serviced, in such cases the ICTs were just used to organize appointments and meetings. It also specifies that imparting training and technical support to use the system is a hygiene factor which will lead to User-satisfaction, but the Users think that providing more support and training to read and interpret the reports in

a mechanical way will only lead to incorrect interpretation and probably will result in ineffective pitching to the client. Complex sales task will not be comprehended correctly and too much of standardization would have a negative effect on their effectiveness and creativity at work.

Information-Quality is a strong predictor of Individual-Impact. This implies that for most of the run rate business, repeat orders and to sell new products that are introduced in the market, which require continuous access to data like current and past customers' and product sale reports, accuracy of the reports, updating relevant and periodic reports, new product information, product inventory reports, product delivery, sale pipeline generation status, and easy to understand format of the reports. All these features make the sales representatives more productive and effective in their work. Having seamless access to the information enables them to analyze and apply the learning to their core task, which is sales and relationship management with their customers.

Service-Quality is also a strong predictor of the Individual-Impact. This implies that ease of navigation, responsiveness of the system, and providing complete information facilitates the productivity and effectiveness of the sales executives.

Variables Individual-Impact, Information-Quality, System-Quality, and User-Satisfaction are strong predictors of Organization-Impact, whereas the influence of Service-Quality is insignificant. Again, User-satisfaction is negatively related to Organization-Impact. The constant is insignificant in the Model.

Individual Impact is a strong predictor of Organization-Impact. This implies that the Sales Representatives perceive that with improvement in their productivity, effectiveness and good quality of work, the organization performance has also improved.

User-satisfaction is also a strong predictor of Organization-Impact. As in the case of the Net benefit of Individual-Impact, it is also negatively related to Organization-Impact. This reinforces the finding that training and support provided to operate the system are necessary conditions. Once the sales representative can operate the system as an expert, too much of refresher training is not considered as an advantage but perceived to be waste of resources of money, time and revenue. The review of literature of the paper (BenMoussa, C., 2007) which is a case study of sales force of a pharmaceutical company that deals with understanding the barriers for performance through the digital tools. It again highlights the same issue that the objective of implementing the SFA or any digital tool should be emphasized. The training needs, especially the refresher training regarding the tool should be not generalized to all sales force as this mechanical approach is perceived by many sales personnel as waste of their time and resources rather than using it to their advantage for the key objective of improving their productivity and efficiency.

System-Quality and Information-Quality are also strong predictors of Organization-Impact. This implies if the DIGITALIZATION system design is robust, flexible and adaptable to the needs of the sales representatives and if it provides all the product and customer status data at their fingertips, it will lead to cost savings as travelling to the office will become less frequent, improve revenue as orders are logged in real time and it also improves customer response time, as any complaints and issues are updated and flagged promptly, and actions can be initiated remotely. The sales process of pharmaceutical industry in India demands the Sales representatives to spend most of their time visiting Doctors and Chemist of their predefined territory. Since the DIGITALIZATION enables them to liaison with their office they get more time to spend with their customers which ultimately leads to overall cost savings to the organization, revenue enhancement, improvement in the customer response time and enhanced Brand/Corporate image.

Service-Quality has no significant influence on Organization-Impact, but it does have an indirect influence on organization benefit, because it influences the Individual-Impact, which is a strong predictor of Organization-Impact.

Not too many studies in the Indian continent in the Pharmaceutical Industry are conducted in this area of research. Further research can be conducted by an enhancement to the model to make it self-sustainable. Feedback and inputs of the sales employees, customers (doctors) and other stakeholders (distributors, vendors, third party logistics, etc.) can be incorporated and time-study can be conducted to understand its effectiveness. The DIGITALIZATION system can be continuously upgraded and altered through the following 3 approaches.

i. Encouraging Users of the system to provide in-puts, suggestions and complaints, regarding the changes they need in the system. A time-series study comparing the performance of the Users before and after use of the system and with every change or upgradation made to it. Conducting customer satisfaction studies to understand if the customer satisfaction levels have improved. The matrices for this measure would be 'customer response time' and 'effectiveness of the Sales force'.
ii. Measuring performance parameters with regards to trade partners. Taking continuous feedback regarding real time order entry and uploads and stock delivery status.
Updating and altering the System Design based on the reports of the Voice of the customer and measuring the effectiveness through the Net Benefits.
iii. Providing input to the System Design stage from the e-CRM and social media analytics inputs, which is the true pointer of the customer satisfaction level.

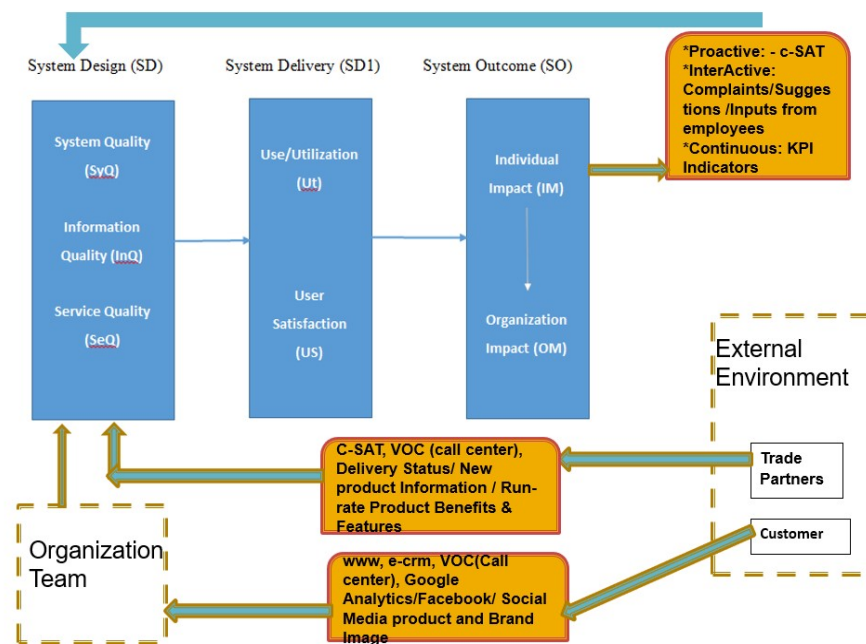**Making the Model Self-Sustaining and Adaptable (Closed Loop)**

Figure 3- Proposed Model for future research

7. Conclusions

Technology applications thus have great business implications, only if organizations implement the applications keeping in mind the core net benefits that they seek to achieve. They also need to understand that too much standardization due to technology applications will not always lead to enhanced productivity and effectiveness. Any technology applications should be people centric and not just data centric so that the employee creativity is not curbed.

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