

E-PROCUREMENT ESPOUSAL AND ASSESSMENT FRAMEWORK FOR KARNATAKA STATE PHARMACEUTICAL COMPANIES

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Abstract

Electronic Procurement (e-procurement) solution is receiving tremendous attention from all kind of industries. Indeed in today's global business scenario use of the latest technology in organizations is no longer afterthought, rather it has gained huge importance. Organizations are rapidly incorporating their main business functions with third parties and technology platforms. With this emerging trends, companies have been forced to reengineer their business process from the traditional methods to electronic platform. Companies have begun to realize that investing in e-procurement technology pays dividend in the long run and that the reduction in the overhead costs which follow can enable them redirect their resources towards more strategic initiatives. The pharmaceutical industry stands out in particular because it entails large financial investments, a diverse variety of businesses and people, as well as major political and procurement policy implications. The peculiarities of the pharmaceutical industry's e-procurement process, the necessity of purchasing and selling items, and other measures to control the procurement cycle all have a significant impact on it. This initiative aids in lowering costs, reducing lead times, fending off competition, and making requirement planning practical. The use of electronic procurement by pharmaceutical corporations was sparked by this realization. This realization leads to the espousal of electronic procurement in the pharmaceutical companies. This paper aims at examine the various parameters influence the espousal and assessment parameters. Additionally, to progress toward developing a comprehensive framework that demonstrates the successful implementation of e-procurement in the pharmaceutical companies in the state of Karnataka.

Keywords: E-Procurement, Pharmaceutical, Supply chain management, Manufacturing. Framework, Electronic Procurement

INTRODUCTION

E-procurement is basically an electronic communications tools used to help in the transactions which facilitate any purchasing process. The terms electronic procurement resulted from the electronic support of procurement practices between the supplier and buyer via information and communication technologies. Adoption of this new technologies helps organizations to increase productivity, which in turn helps organization to grow tremendously. On its own e-procurement can be seen more largely as an end to end key which participates and modernizes every procurement system all over the organization.

This system was introduced in 1960s, was used in the mid of 1990s and took a shift towards the use of internet for electronic purchasing, the main idea of e-procurement was to include the end user in the process of using electronic means and closing the process of procurement. There are five basics of procurement via electronic procurement medium which are directed towards improving the procurement performance i.e., right place, right time, right quality,

right quantity and right source. As per “Pharmaceutical Global Market Report 2022”, the global pharma market is expected to grow from \$1454.66 billion in 2021 to \$ 1587.05 at a compound annual growth rate of 9.1% (CAGR). The market is expected to reach \$2135.18 billion in 2026 of 7.7% (CAGR). The pharmaceutical market consists of pharmaceutical drugs and biologics and related services by organizations that produce pharmaceuticals used as medical purposes in the treatment of diseases. [1] 60% of global demand for various vaccines supplied by Indian pharmaceutical companies, 40% of generic demand for US and 25% for UK and 20% worldwide. India contributes the second largest share of pharmaceutical companies in the world.

India ranked as 3rd worldwide for pharmaceutical production by volume and ranked 14th by the value. The country established domestic industries with 3000 drug companies and approx. 10500 manufacturing units. The domestic market is expected to grow 3X in next 10 years and it is estimated at \$ 42 billion in 2021 and likely to reach \$ 65 billion by 2022 and further to \$ 120-130 billion by 2030. India is the 12th large exporter of the medical goods in the world, India supplied a total of 584.6 lakh of COVID-19 vaccines to 71 countries. Nearly 1lakh crore rupees to be funded under union budget of 2021-22 to boost the manufacturing of pharmaceutical ingredients domestically within the year 2023. [2]

Pharmaceutical companies are very unique which involve huge expenditures, range of stakeholders and people and also the dominance of government and procurement policy implications to be considered. E-procurement procedure in pharma industry are peculiar in nature and are highly influenced by the nature of manufacturing process need, buying and selling of materials and other initiatives to handle the procurement cycle. This initiative helps to reduce the cost, lead time, fight competition and requirement planning become feasible. [3]. This study has identified various key dimensions of espousal for the successful espousal of pharmaceutical procurement and for the assessment of various key parameters and to check the success of the implementation post espousal of e-procurement.

This exploration was developed through literature reviews and consequently was verified by the process of data collection in the selected pharmaceutical companies in the Karnataka State. This study will explain how the espousal and assessment of e-procurement system as a part of IT enabled platform will streamline the procurement process and add value to the procurement activities of e-procurement. In addition to this, tried to develop the framework to be considered during and post implementation of e-procurement particularly for the pharmaceutical companies in Karnataka state.

LITERATURE REVIEW

E-procurement embodies an internet based business process for obtaining materials and services and managing their inflow into the organizations [4]. E-procurement is about using the internet to operate the transactions of requisitioning, authorizing, ordering receiving and payment processes for the required product or service [5]. E-procurement is very important and essential as it makes purchasing activities more effective in terms of both cost and time which in turn help the Indian Industries to grow and compete in the global area [6]. The future

of e-procurement is more cost effective than the manual one [7]. The benefits related with e-procurement are overpowering the risks and risks are diminished with the passage of time and more companies' implementation in future. Cost reduction was acknowledged as the most important benefits with e-procurement in the Swedish and Indian Firms [8]. E-procurement not widely espoused due to the barriers like resource constraint, technology, legal and government environments. Efforts from all stakeholders including employees, supplier, customers, system developer and government /policy makers to overcome these barriers [9].

The critical success factors are employers business process reengineering , training, top management support and progressive leadership for business growth, encouraging green operations, flexibility, strategic alliance among buyer and supplier, collaboration with suppliers, streamline work flow, legal standard [10]. The factors affecting the adoption of e-procurement in Rwanda are perceived usefulness, perceived use of use, training provided to employees and infrastructural support to affect the performance of organizations positively [11].

Luay considered the factors affecting e-procurement usage and relative advantage of technology, technology compatibility, technology complexity, organizational readiness, top management support and competitive pressure on the usage of e-procurement [12]. Operational variables study revealed the following parameters influenced the e-procurement as determining the success on user adoption of E-procurement in Kenya Govt. Ministries are system quality, information quality, service quality, usage, user satisfaction and net benefits. The system qualities are Performance by e-procurement module, availability of e-procurement module, response time between request and feedback and usability (speed, ease and intuitiveness). The information qualities are Accuracy, understand ability, and relevance. The service qualities are IT support and network up/down time. The usages are Nature of use, number of executed transactions, navigation patterns and number of site visits. The user satisfactions are repeated visits and user surveys. The net benefits / user benefits are Reduces search cost, time taken to complete transactions instructions and P2P module saved the organization money [13].

The benefits of e-procurement as cost savings, time savings, reduced inventory level, reduced inventory cost, reduced paperwork, reduced duplicate records, improved management information, control over procurement process, better control and spend, improve relationship with suppliers and buyers, increasing purchasing power, interest profit margin, improved efficiency in procurement process and general competitive advantage.[14,15,16].

From the above literature reviews, it is evident that there are expected outcomes in espousal of e- procurement, some of the parameters are critical to consider whether it is an expected benefit or problem which they can face during the espousal. According to pharmaceutical listed companies in India, 4% of 160 pharma companies are located in Karnataka state in which most of the top pharmaceutical companies supply chain functions espoused with various e-procurement platforms [17].

This study then sought to establish the parameters affecting the espousal of e-procurement and its assessment of pharmaceutical companies in selected pharmaceutical companies in Karnataka state. In addition to this the attempt made to propose an integrated framework for both espousal and assessment of e-procurement in the selected pharmaceutical companies located in Karnataka state.

METHODOLOGY

Research Design

This study is an exploratory research, the objective of the study is to find out the issues in the existing procurement process in the pharma companies and to find out the need for the future e-procurement system and further to develop an integrated e-procurement framework. This study identified the key parameters and their features which contribute to the framework. The exploration of the parameters for the pharmaceutical companies done through literature review and case study through questionnaire. Various key parameters are identified to develop an integrated framework for the espousal and assessment of e-procurement in the selected pharmaceutical companies in Karnataka state.

Sampling Design

The study pertains to the selected pharmaceutical companies in India, preferably in Karnataka state of India since 14% of Indian pharmaceutical companies are located in Karnataka. According to the pharmaceutical listed companies in India by Net sales as per BSE on 9th September 2022, the total listed pharmaceutical companies in India is 160 [17]. 7 pharmaceutical companies (4%) are located in Karnataka out of 160 pharma companies in India.

Sampling Size

From the top seven Karnataka pharmaceutical companies, two pharmaceutical companies are selected as samples from BSE India listed on 9th September 2022 based on net sale values in Crore on largest market share along with various procurement activities involvement. Considering the convenient sampling technique and on the merit level of electronic procurement initiatives taken along with willingness to cooperate companies were filtered out to perform case studies on them. In total case studies for companies carried out and some common parameters of electronic procurement, espousal and assessment were identified through this exploratory case study.

Various key parameters development

Extensive literature survey was carried out to identify various key dimensions of the study. Even though it was difficult to find literature in Karnataka state context since there has not been many research done in this area, the research done in the other countries were explored and they were used as the foundation to create the questionnaire.

Key parameters for Espousal

The key parameters are identified and studied under five heads

- 1) Benefit – 54 parameters
- 2) Barrier – 35 parameters
- 3) Critical success Factor – 27 parameters
- 4) Intension to use – 5 parameters
- 5) User satisfaction – 9 parameters

Key parameters for Assessment

The key parameters are identified and studied under three heads

- 1) Improved Service – 35 parameters
- 2) Cost optimization – 14 parameters
- 3) Process Improvement – 22 parameters

The questionnaire was developed using the above parameters and dimensions with the data collection as explained below

Method of Collection of data

The study analyzed the level of satisfaction about the traditional and the espoused new e- procurement system for the supply chain activities. A structured questionnaire was used to collect the data which was prepared in English as the background information confirmed that almost all selected employees were conversant with English Language.

The questionnaire was prepared based on the information collected through literature survey and was prepared to gather information related to research objectives. The questionnaire mainly consist of closed ended questions, the response for majority of questions were in the “five-point” Likert scale based on the impact of parameters derived from literature review as below

- 1) Totally disagree
- 2) Disagree
- 3) Uncertain
- 4) Agree
- 5) Strongly Agree

Collection of data was done by principal investigator.

Measures

- Participants level of agreement on the parameters of e-procurement espousal during implementation
- Participants level of agreement on the parameters of e-procurement assessment post espousal
- Development of integrated framework for espousal and assessment of e-procurement for pharmaceutical companies

RESULTS

Analysis of data

The filled questionnaire was coded for the convenience of the data entry. The analysis of data was carried out by using statistical software - Minitab 17. Descriptive statistical tools are used in the analysis of primary data like frequency, percentage, mean and mean ranking to represent the data set and arriving the sensible conclusion. This analysis used in identifying the trend and a pattern in the collected data from the sample which represents the overall population. Out of all the questionnaires (n=35), 35 respondents responded to the questionnaire with response rate of 100%.

E-procurement espousal Parameters

Benefit parameters

There are 54 various benefit parameters are analyzed with 35 respondents and found the mean average as 4.0661 and the benefits are ranked according to their importance provided by the respondents.

Figure 1: Benefits

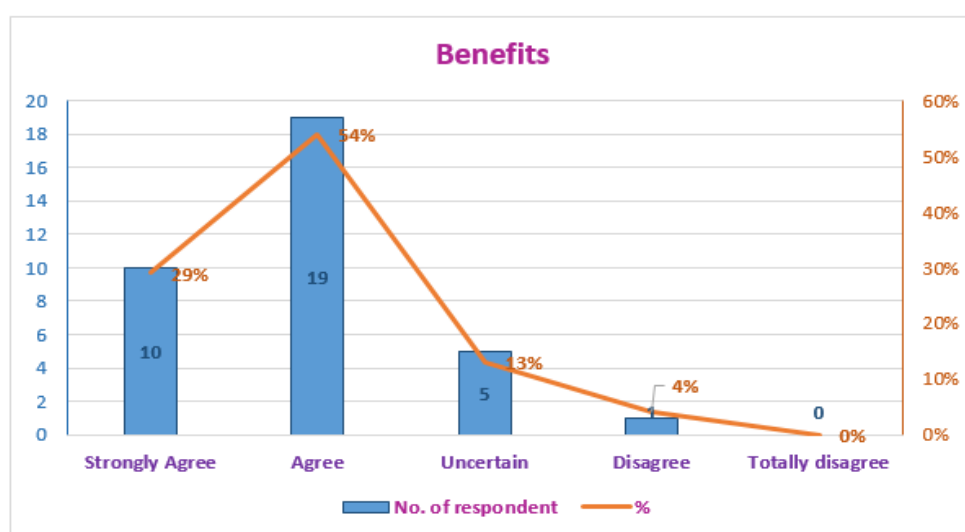
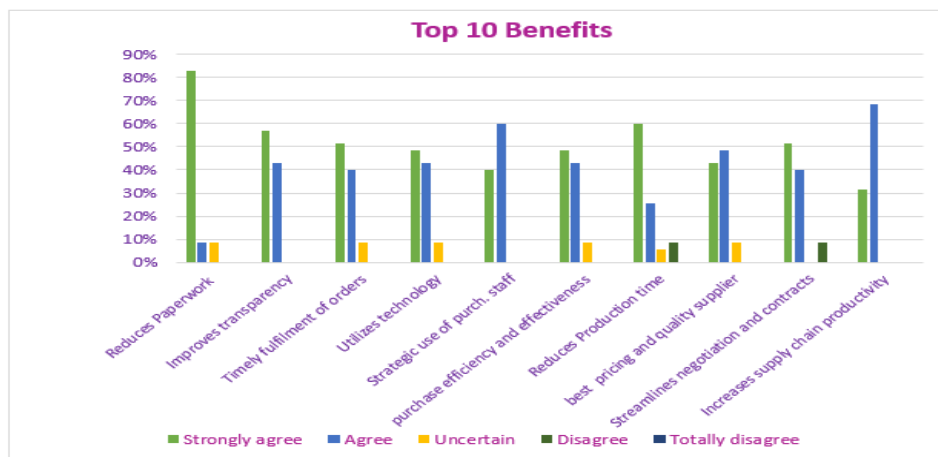


Figure 2: Top 10 Benefits



29% of respondent strongly agreed, 54% of respondents agreed on the benefits sensed during espousal of electronic procurement, however 13% are uncertain, 4% did not agreed on the sensing the benefit. From these responses it is observed that 83%% of respondents perceived the benefits of electronic procurement in their organizations. The top benefits parameters based on the mean ranking are reduction of paper, improved transparency, timely fulfilment, uses technology, strategic use of staffs, improvement in efficiency, effectiveness and productivity, reduced production time, streamlines negotiation process in the purchase functions.

Barrier parameters

There are 35 various barrier parameters are analyzed with 35 respondents and found the mean average as 3.0987 and are ranked according to their level of challenges faced by the respondents.

Figure 3: Barriers

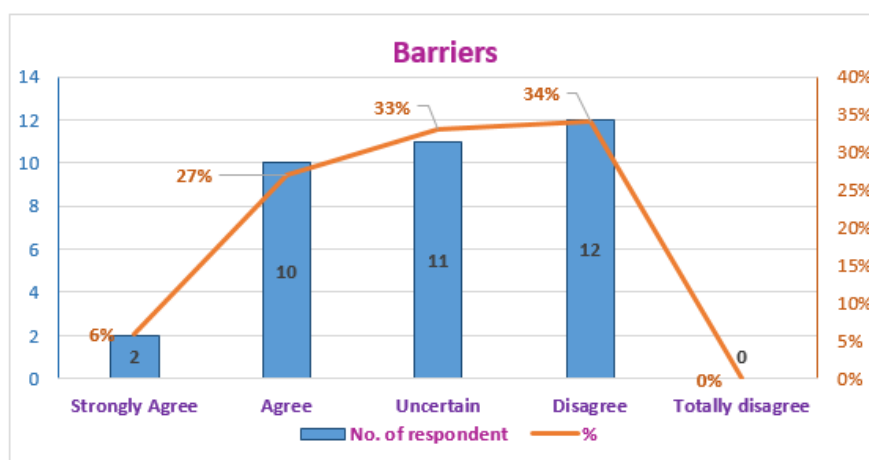
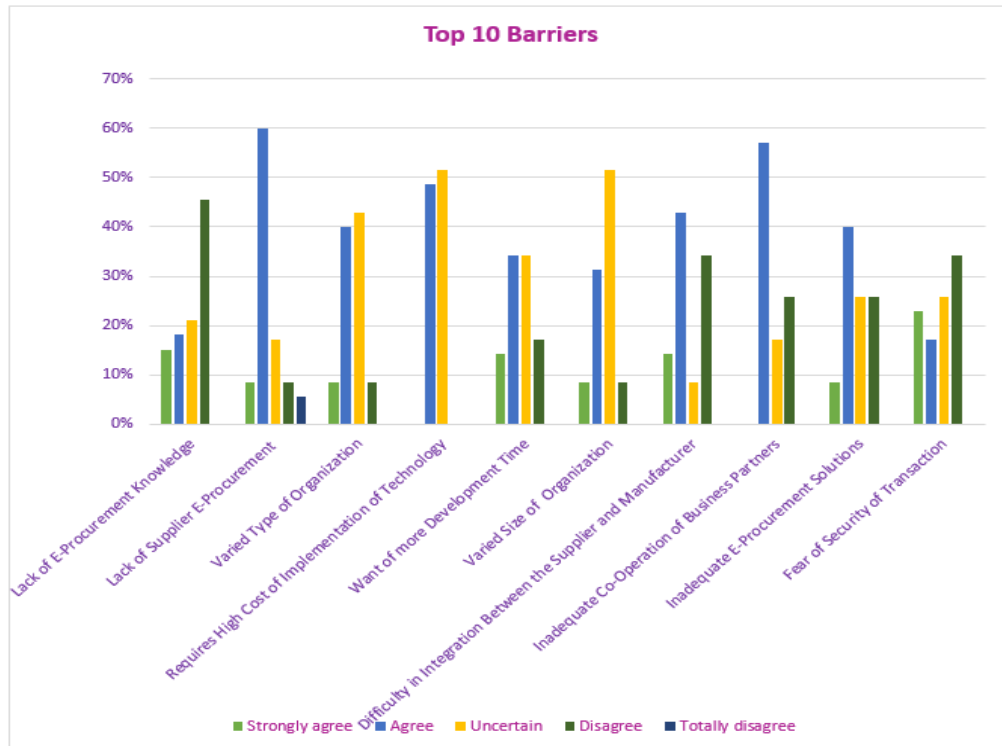


Figure 4: Top 10 Barriers



6% of respondent strongly agreed, 27% of respondents agreed on the challenges faced during espousal of electronic procurement, however 33% are uncertain , 34% did not faced any challenges/barriers during implementation of the electronic procurement in their organization. From these responses it is obvious that only 33% of respondents faced the challenges during implementation of electronic procurement in their organizations which clearly indicated that 77% of the respondents not faced much challenges while implementing the electronic procurement in their companies. The top challenges faced by the respondents are parameters based on the mean ranking are lack of e-procurement knowledge, lack of supplier e-procurement, type of organization, high cost of implementation, high time of development of system, size of organization, inadequate business process to support e-procurement, cooperation of business partner, inadequate e-procurement solution, and fear of security of the system.

Critical Success Factor parameters

There are 27 various critical success factors parameters are analyzed with 35 respondents and found the mean average as 4.022 and are ranked according to their level of criticality of the factors which influences the success of implementation sensed by the respondents.

Figure 5: Critical success factors

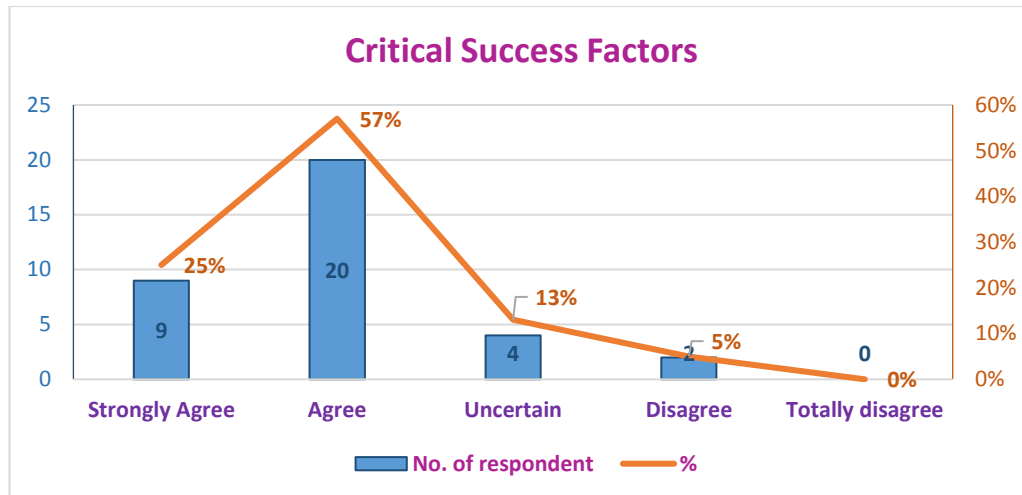
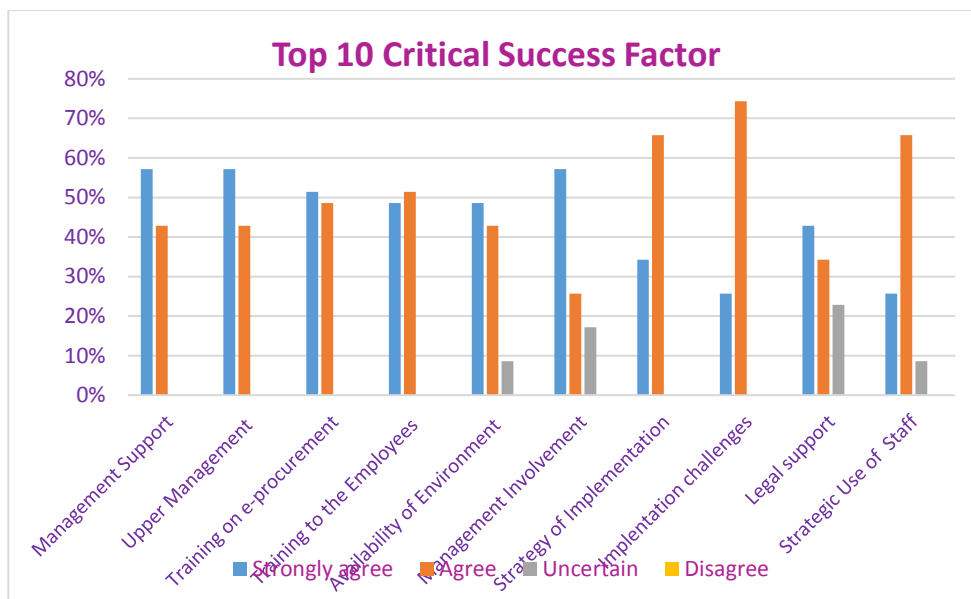


Figure 6: Top 10 Critical success factors



25% of respondent strongly agreed, 57% of respondents agreed CSFs during espousal of electronic procurement, however 13% are uncertain , 5% of respondents are disagreed and none of the respondents are totally disagreed the criticality of electronic procurement in their organization. From these responses 82% of respondents agreed on the CSF are sensed on the criticality of electronic procurement in their organizations. The top CSF are parameters based on the mean ranking are management support and involvement, initial training to the employees, environment, strategy used for implementation, expected challenges during implementation, legal support and strategic usage of staffs where being implemented.

Intension to use parameters

The impact of intension to use is studied with the response of the employees of pharmaceutical companies' responses. The analysis made by mean ranking and the percentage analysis. The average score for the intension to use parameters is 3.9028.

Figure 7: Intension to Use

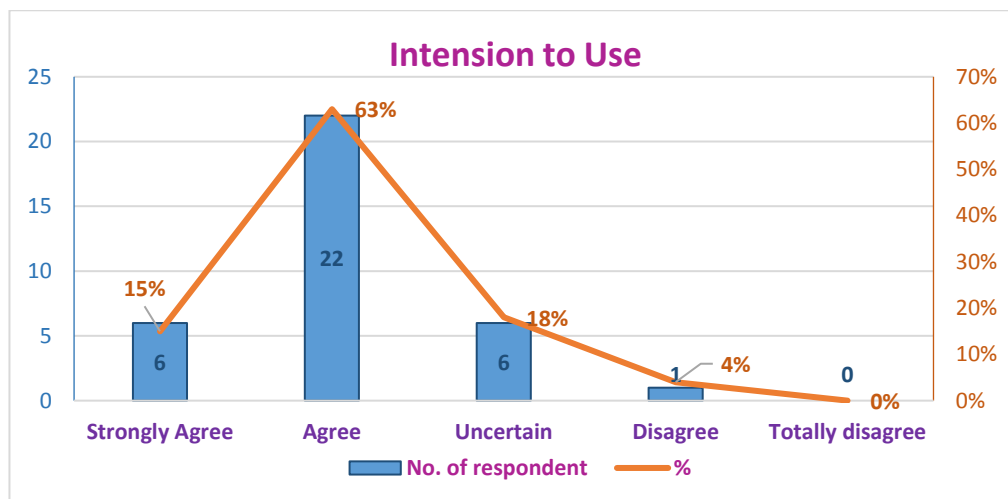
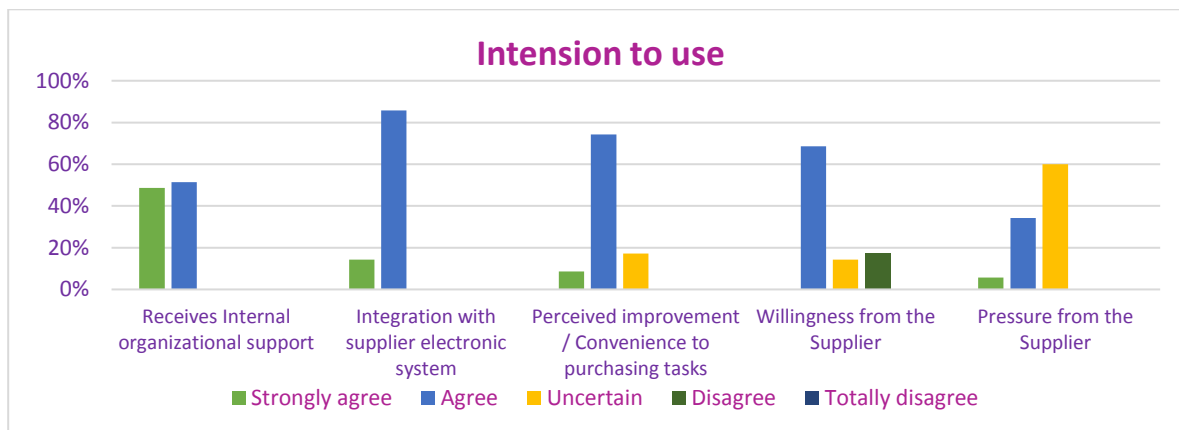


Figure 8: Intension to Use



15% of respondents strongly agree, 63% of respondents agree on the intension to use parameters are to be considered during implementation of the electronic procurement. 18% of the respondent is uncertain on this parameters whereas only 4% of the respondents are not agree on this. Nobody has totally disagree on this parameters influence on the implementation of electronic procurement in the pharmaceutical companies. The intension to user parameters to be considered based on the mean ranking method of analysis are internal organization support, integration with supplier electronic system, perceived improvements/convenience to purchasing tasks, willingness from the supplier and pressure from the supplier.

User Satisfaction parameters

The impact of user satisfaction analyzed with 9 parameters by mean, percentage analysis and mean ranking method based on the response of the employees of pharmaceutical companies' responses. All the parameters are more than mean of 4 which clearly indicate the user satisfaction is the most important parameter to be consider during the implementation of the electronic procurement. The average of all 35 respondents is 4.0983. 25% of the respondents strongly agreed and 59% of the respondents are agreed that the user satisfaction is influencing the implementation of the electronic procurement. 16% of the respondents are uncertain on this parameter and no one disagreed or totally disagrees on the importance of user satisfaction during the espousal of e-procurement in pharmaceutical companies. The user satisfaction parameters to be considered based on the mean ranking method of analysis are training provided to users, when they ease of use, computer self-efficacy, exchange of knowledge, infra structural support, reliability of system, receives usefulness, involvement of employees and accuracy and on time delivery.

Figure 9: User Satisfaction

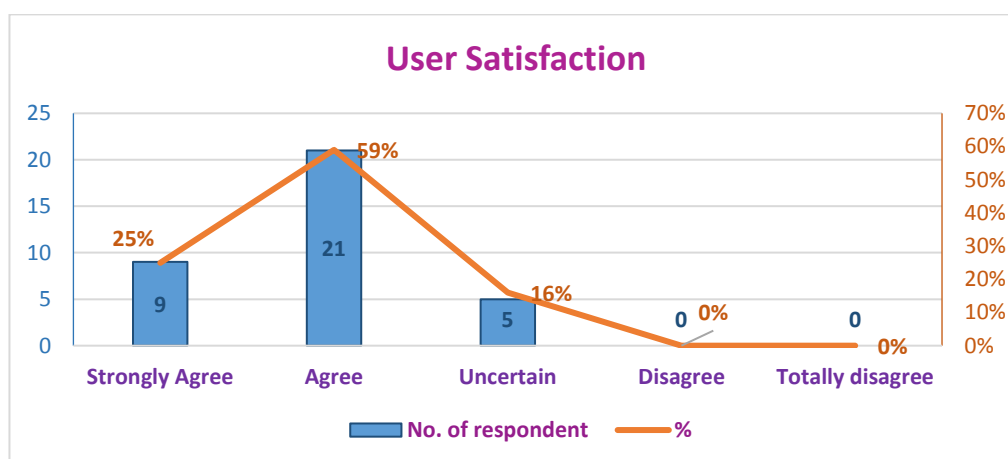
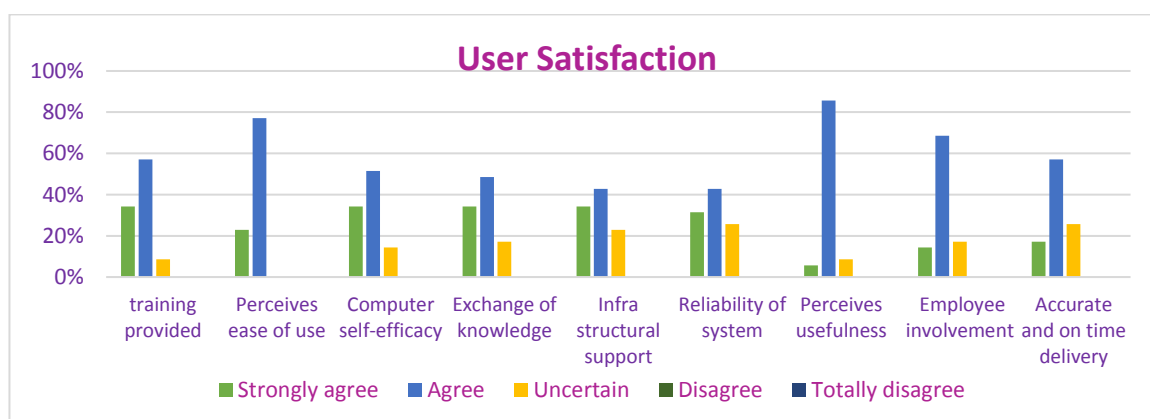


Figure 10: User Satisfaction



E-procurement assessment Parameters

Improved Service parameters

There are 19 out of 35 improved services parameters are scored more than 4 mean and average mean of all improved services is 4.005. 28% of respondents are strongly agreed and 54% of the respondents are agreed on the improved services sensed by them. 9% of the respondents are uncertain on this and 9% of the respondents disagree on this and none of the respondents totally disagree on the improved services. Overall 82% of the respondents sensed the improvement in the services provided by electronic procurement in pharmaceutical companies. Top 10 improved services sensed by the respondents are improves transparency, improves information quality, access to better information, improves interactions, improves MIS, increases efficiency, accuracy, increases the vendor base, reduces errors in transactions and provides market access to new market based on the mean ranking method of analysis.

Figure 11: Improved Services

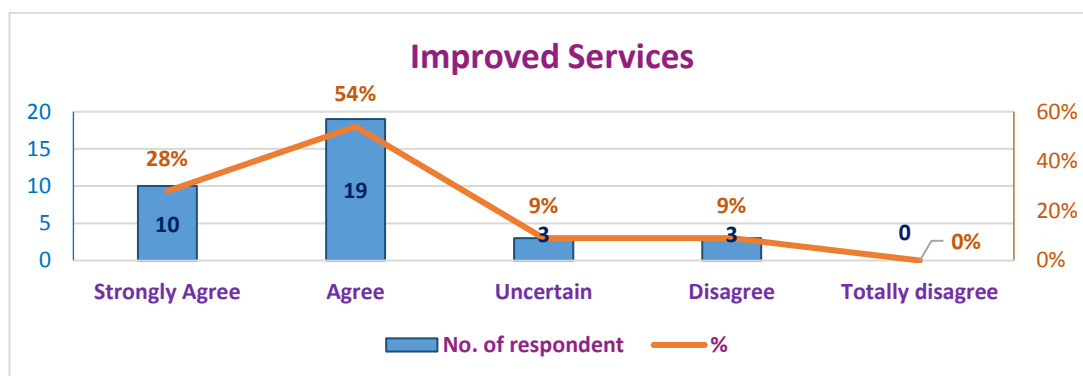
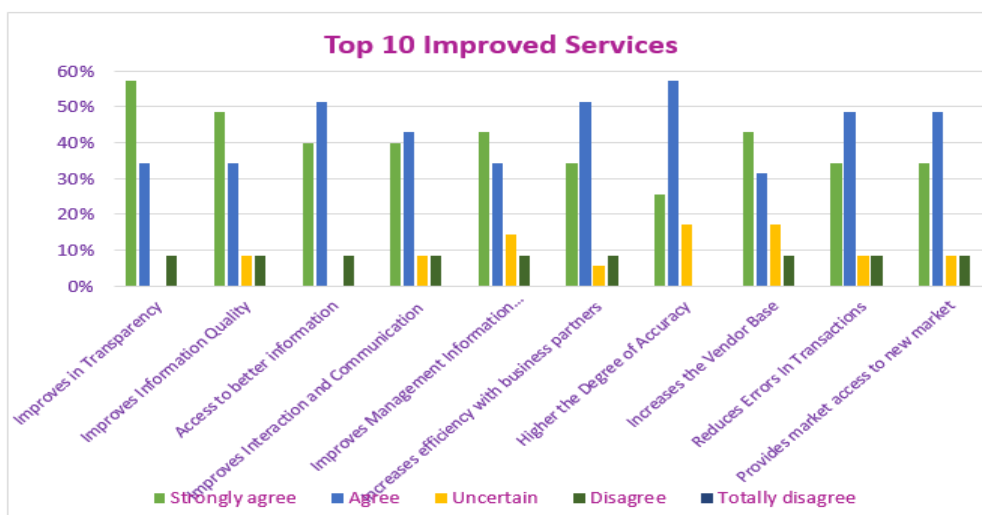


Figure 12: Top 10 Improved Services



Cost Optimization parameters

The parameters in which the cost involved in the traditional way of procurement reduced by e-procurement and thus the cost of total purchasing function optimized. This agreement is provided by the respondent through this study conducted with 14 cost optimization parameters in the selected pharma companies. Almost 14 parameters scored mean ranking as more than 4 by which the optimized the cost and thus increased the profit of the organization. The average of mean for all 14 parameters is 4.3082. 47% of respondents strongly agreed, 38% of the respondents agreed on the achievement of cost optimization and 15% are uncertain. However no one either disagree or totally disagree on this cost optimization. So the cost optimization is the important outcome of espousal of e-procurement in the selected pharmaceutical companies. The top 10 pharmaceutical cost optimization parameters are paper work reduction, compliance improvement, error reduction, invites competitive bids, improvement in price, and decrease in transaction cost, reduced inventory cost, profit increase, reduced contract cost and reduced in the ordering cost as well.

Figure 13: Cost Optimization

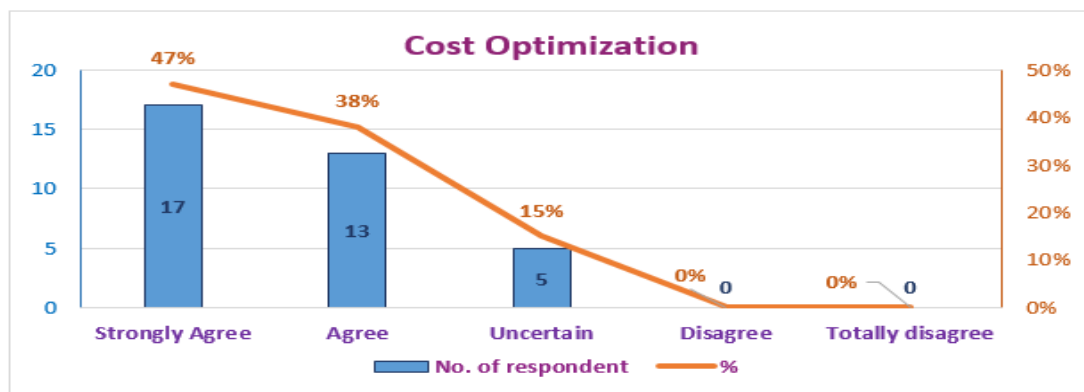


Figure 14: Top 10 Cost Optimization



Process Improvement parameters

Process improvement parameters are the parameters in which the improvements done because of implementation of the e-procurement. 17 (77%) parameters out of 22 are ranked more than 4 mean ranking based on the responses provided by the respondent of the pharma companies. The average mean for all process improvement parameter is 4.1428. 30% of the respondents strongly agreed on the process improvement sensed, 56% of them are agreed on the same, however 13% are uncertain. 1% of the respondents disagree on the process improvement and no one totally disagree on the improvement in process post espousal of the electronic procurement in the pharmaceutical companies. In total 86% of the respondents agreed on the improved services achieved by implementation of e-procurement. The top 10 process improvements parameters are staff exposure to technology, improves coordination and control and monitoring, streamlines procurement process, reduces the automation time, improved process flow, improves employee commitment towards acceptance, management commitment towards acceptance, enhance interaction with business partners, enables standardization of procedures and fasten time to market.

Figure 15: Process Improvement

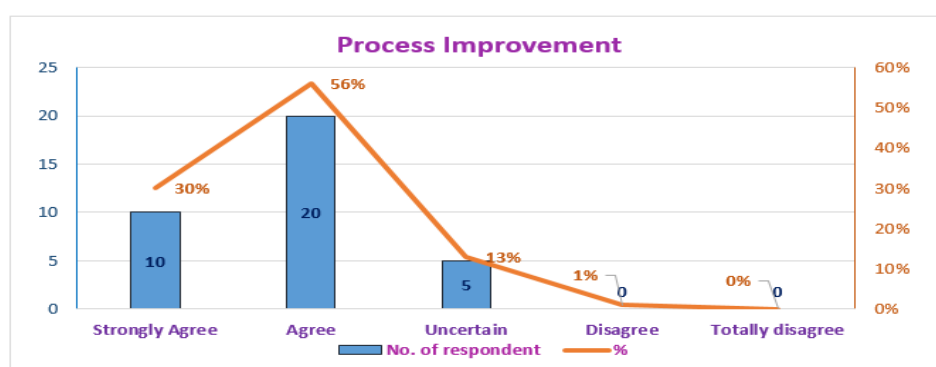
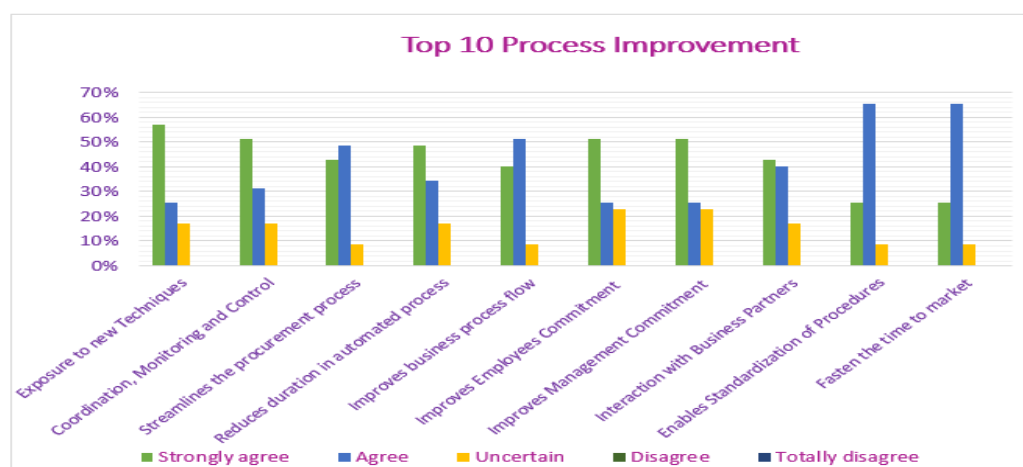


Figure 16: Top 10 Process Improvement

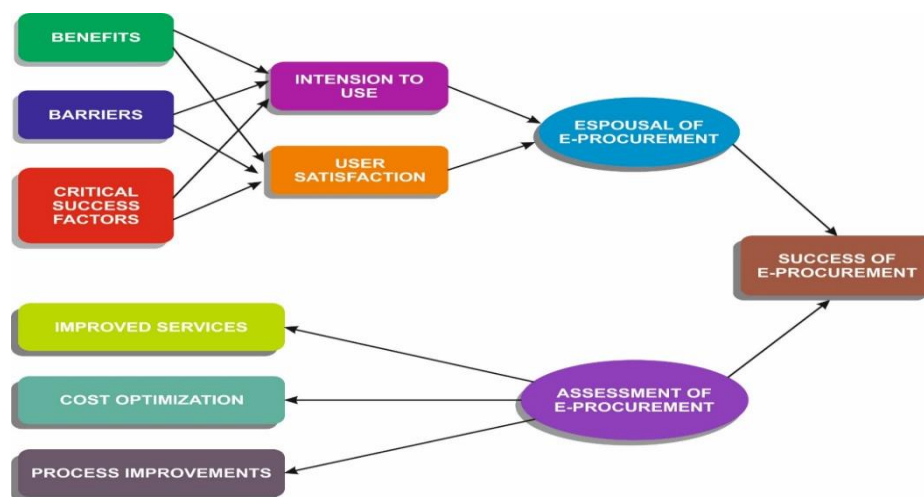


Framework for espousal and assessment of e-procurement

The initial framework developed based on the responses received from the respondents on the parameters of espousal and the parameters of assessment. The perceived benefits, barriers and critical success factors and their influence on the intention to use and user satisfaction. The improvement seen in the process of procurement, optimization of cost involved in various transactions and the service improvement delivered post espousal determines the successful adoption and its evaluation in the pharmaceutical companies located in Karnataka state.

The framework derived from the case study conducted in Karnataka state pharmaceutical companies and their data analysis the following framework for both espousal and assessment framework for pharmaceutical companies.

Figure 17: Framework for espousal and assessment of e-procurement



DISCUSSIONS

Pharmaceutical purchases are very peculiar and unique in nature which involve huge expenditures, huge range of stakeholders and people, also the dominance of government and procurement policy implications to be considered and highly influenced by the nature of manufacturing process need, buying and selling of materials and other initiatives to handle the procurement cycle. This e-procurement initiative helps to reduce the cost, lead time, fight competition and requirement planning become feasible. This study has identified various key dimensions like benefits, barriers, critical success factors, intension to use, user satisfaction before espousal of electronic procurement and process improvement, cost optimization and improved services post espousal of the e-procurement. Then framework for the espousal and its assessment of e-procurement developed based on the identified parameters. The framework helps in contributing increase the success of espousal of Pharmaceutical procurement and hence develops performance as well as competitive measures of manufacturers. This exploration was developed through literature reviews and consequently was verified by the process of data collection in the selected pharmaceutical companies. This

study explained how the espousal of e-procurement system as a part of IT enabled platform will streamline the procurement process and add value to the procurement activities by analyzing the parameters for the espousal and assessment of e-procurement in selected pharmaceutical companies.

Espousal of e-procurement

All of the employees of the pharma companies accepted that all the above benefits, challenges, critical success factors, intension to use, user satisfactions are to be considered before espousal of e-procurement in their companies since the respondents agreed the above parameters influences the success of the electronic procurement as mean ranking of more than 4 which clearly indicated that the respondents are strongly agreed and agreed through this study. Benefits are the parameters to be considered while making the decision of adopting the e-procurement. The management of pharmaceutical companies to make strategic decisions to overcome the major barriers for the successful espousal of the e-procurement in their companies. Top management support, adoption of process, initial training and business process re-engineering are the factors that majorly impacted the success of the implementation of e-procurement and supplier influence, e-procurement in other industries and legal influence are impacted in the lower rate. The companies to review and improve/strengthen the major CSFs to increase the success of the espousal.

Assessment of e-procurement

This study clearly indicated almost all the parameters considered in improved services, process improvement and cost optimization are highly influences the outcome/ success of the espousal of e-procurement since these parameters scored more than 4 mean ranking. The management has to review and analyze the feedback on continuous basis to ensure the post espousal benefits and strengthens the system to attain optimum profit out of implementation of e-procurement in pharma companies

Framework for espousal and assessment of e-procurement

The framework for the successful implementation and to get maximum output of espousal of e-procurement developed through the study on the parameters collected and refined data through intensive literature review, formed questionnaires and its responses from the selected Karnataka pharma companies who are practicing and on improving the system in a continuous manner. This framework will help other pharma companies to consider the parameters before and after implementation of the electronic procurement and thus increase the productivity and profitability of the organizations

CONCLUSION

The study revealed that many pharmaceutical companies started implementing e-procurement platform to increase their cost benefits in the function of supply chain, transparency in the purchasing process, to reduce the changes of errors, standardization of the process thus to increase the operation efficiency to get more cost benefits.

The pharma companies which are using e-procurement platform achieved huge cost saving and other intangible benefits after espousal of e-procurement in their organizations to attract their clients. Even though the benefits are more in espousal of e-procurement platforms, still the companies are facing some barriers as challenges to espouse the same like acceptance of change management and new technology adoption into the existing system, infra structural development and its cost implication, IT skilled staffs to understand the relevance and difference of process and thus to provide the support to ease the employees to operate the new platform. This study also found out the major critical success factors which influence/impact the success of the e-procurement espousal. Support from top management, process adoption support to the new platform, initial training and commitment of management on the new platform and process reengineering in the new platform impacted the success of the espousal. The total success of the espousal of the companies depends on the critical success factor strengthening to achieve the perceived benefits and to overcome the barriers over a period of time. This study identified the improvements in services, process of the procurement function and indicated where the management should concentrate on the reduction/ cost optimization post implementation. The management should get feedback from the users on continuous basis to increase the benefits of the electronic procurement implementation. The proposed frame work will be used to measure the extent of the success of the implementation of e-procurement. The pharma companies have to derive the strategic policies and to develop some management commitment on the implementation of e-procurement.

LIMITATIONS

Confidentiality was a major obstruction in gathering information relating to e-procurement parameters in the pharmaceutical companies due to highly competitive market of pharma products and its associated raw materials, packing, consumables and spares. The researcher informed the respondents in advance that the purpose of the research was meant for academic purpose only and not for other investigations although the same was stipulated on the questionnaire. The study was undertaken on e-procurement parameters before implementation and post implementation assessment for the successful espousal of e-procurement in selected pharma companies. The study recommends that a further study can be carried out to establish in other state of Indian Pharmaceutical companies and other countries as well. A further study should be carried out to conduct in other manufacturing industries as well.

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