

## Factors Determining Acceptance of Electronic Supply Chain Management (E-SCM) Procurement System at PETRONAS

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### ABSTRACT

In this paper the researcher is gauging the factors influencing the acceptance of suppliers toward the Electronic Supply Chain Management (E-SCM) practiced by Shared Materials Services Organization (SMSO) at PETRONAS, Kertih, Terengganu. The E-SCM system is called SAP-SRM, an application program used as part of supplier management system. This program offers a fully integrated procurement system that will increase an organization's central procurement system as well as the ability to obtain full information across SMSO at PETRONAS, Kertih. In this paper, we are investigating and evaluating the factors that may influence suppliers of SMSO to adopt the E-SCM system. The factors include improvement in efficiency, centralized procurement and better tracking. Data were collected from only 150 SMSO suppliers of the Chemical and Packaging department (cluster) which equal to 150 companies. Results of the correlation analysis and the Linear Regression reveal that all factors, except the variable improving efficiency contribute to the acceptance the new E-SCM system by the suppliers at SMSO. The authors postulate that the result is due to the partial implementation of the E-SCM system by the suppliers in the Chemical and Packaging department.

**KEYWORDS:** Procurement, Electronic Supply Chain Management (E-SCM), Chemical and Packaging Department, Shared Materials Services Organization (SMSO).

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### INTRODUCTION

In a competitive environment, communication technologies and internet enhancement are considered as one of the main innovation catalyst in improving business coordination and integration [1] which contribute to deep changes in supply chain management [2]. The final customer may play an active role in supply chain processes, co-creating unique value for him/herself [3] due to the non-hierarchical and non-sequential nature of internet-based technologies [4]. One of these technologies, Electronic Supply Chain Management or E-SCM provides advanced solutions designed to address the complexity of the supply chain management issues. Electronic Supply Chain Management or E-SCM is considered one of the solutions that will influence the performance of the entire supply chain which include material supply, manufacturing, distribution and transportation. Furthermore, E-SCM is usually adopted to help businesses integrate their resources in the supply chain, improve product quality and cash management and reduce the operation costs [5].

### REVIEW OF LITERATURE

With the use of E-SCM, businesses are able to use real-time information in terms of customer orders, inventory, receivables, payables and sales performance from different sources. E-SCM benefits businesses by shortening sales period, lower sales costs, better co-operation with suppliers and improved efficiency. E-SCM is divided into three sub-modules: that were under the category of e-sales, e-stock and e-purchase. Different groups of users are able to access the module through various portals such as customer, agent, supplier, reseller and employee portal which is molded by the nature of their work and tasks. Consequently, all participants in the supply chain are able to work collaboratively in purchasing of materials, managing warehouses and product selling through the creation of the web base portal. E-SCM is expected to improve business performance, increase market share and enhance customer service through these two components as follows [6]:

- Real-Time Management

Real-time management refers to real time planning, execution and control. Using E-SCM, the impact of supply chain event is immediately shared and communicated. The benefit of real-time management includes continuous closed-loop feedback to instantaneously assess the impact of changing business conditions and the ability to choose the best way to keep each order on track.

- Financial Optimization

The implementation of E-SCM goes beyond balancing demand and supply to discover the best operational and financial supply chain performance. E-SCM delivers solutions that not only solve the on-time delivery, providing the answer to getting the right product to the right spot at the right time-at the lowest possible cost.

Regardless of company size, the core value proposition of E-SCM is to improve corporate profitability and return on capital through cost reduction (via the reduced inventory, improved throughput and better procurement) and increased revenues (via reduced time to market and improved product availability). Having access to accurate information surrounding relevant costs is essential to achieving maximum benefit from an E-SCM initiative [7].

One of the software programs used in E-SCM is SAP-SRM or also known as System Application Program for Supplier Relationship Management. When SAP-SRM is implemented in PETRONAS supply chain management system, it has assisted the management to be more efficient and effective in its procurement processes. The system application program has provided a customized user interface, flexible user-role definition and a clear insight and supplier data. The latest SAP supplier relationship management was used and delivers a fully integrated procure-to-pay solution for automating core procurement processes. SAP SRM delivers exceptional functionality enhancements as well as reducing total cost of ownership [8].

### ISSUES IN E-SCM AT PETRONAS

Adoption of SAP SRM as an electronic Supply Chain Management (E-SCM) system may contribute to the total success of organizations through supplier's understanding and usage of the system. From the interview with buyers (cluster 2, SMSO), researchers discovered that they placed high importance on the company's responsiveness to solve their procurement problems. When suppliers are faced with problems, they tend to contact the buyers (SMSO) rather than trying to solve it by themselves. Consequently, the suppliers become dependent to the "buyer in charge" and it creates delay in processing the required data. Thus, this practice leads to high possibility of SMSO doing transactions with suppliers who do not adhere to the procedure that required them to separate the commercial and technical proposal or quotation. The separation is needed to ensure the smoothness of the procedure in constructing the bid tabulation table and to compare between suppliers and bidder. If the prices being quoted is not equal to what is stated in the proposal, it would be a problem for the buyer to process it. The proposal should be manually sorted in order to separate the price and the description in order for the authorize individual to evaluate the proposal.

Even though it seems to be a trivial problem, the suppliers are required to adhere the procurement procedures in order to maintain the effectiveness of the buying process. Furthermore, regardless of the rules and regulation, some suppliers fail to understand the system due to the lack of sound knowledge in information technology. Hence, it would be difficult for suppliers to fill the information needed or to effectively use the system implemented. This scenario would create conflict and problems that usually happen if there is miscommunication on what are the specific specification or quotation needed. Due to this discrepancy, a large amount of time were needed to solve these problems before the purchase order processes can continue smoothly [11].

In general, many of these problems can be solved if sufficient investments are made in training the respective suppliers. Good skills and experienced IT consultants are very important for ensuring that the program is running smoothly and helping the staff to adapt the new system quickly and efficiently [9, 10].

### CONCEPTUAL FRAMEWORK

Based on the discussion of the issues and literature review, the authors proposed a conceptual framework as depicted in Figure 1.

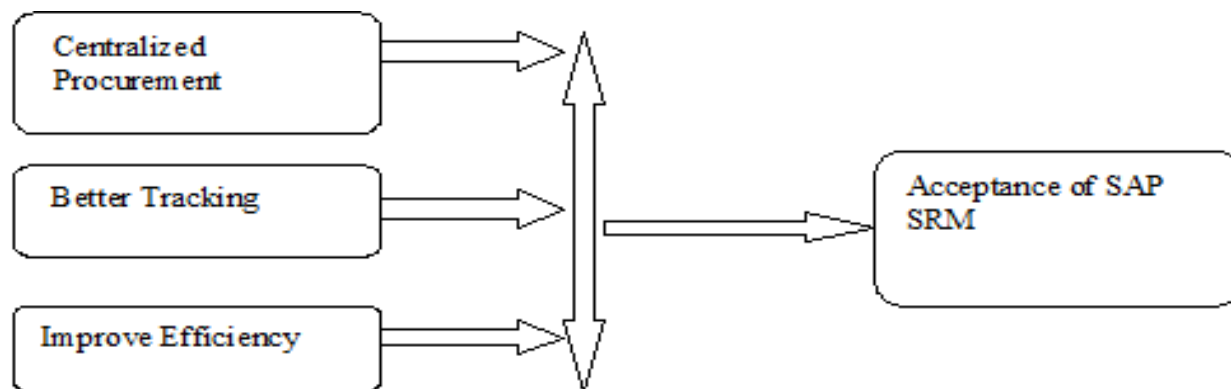


Figure 1: Conceptual framework of the study

## METHODOLOGY

This section describes and explains the sampling plan chosen by the researcher, the instrument that will be used to generate the data in which assist to answer the research question as the outlined in chapter one. It will also explain in detail about the sampling frame, the sampling technique that will be used, the sample size, unit of analysis, data collection procedure, instrument, validity of instruments and plan for data analysis.

### Sampling Frame

A simple definition of a sampling frame is the set of source materials from which the sample is selected. The definition also encompasses the purpose of sampling frames, which is to provide a mean for choosing the particular members of the target population that are to be interviewed in the survey. The sampling frame is the source from which a sample is drawn. It is a list of all those within a population who can be sampled. The sampling frame of this study will be selected from the SMSO registered supplier or known as SUS vendor who have an excess of the SAP SRM system. The list of the suppliers can be obtained from the head of Operational Sourcing at Shared Materials and Services Organization (SMSO), PETRONAS.

### Population

Population refers to the target people, events or things of interest that the researcher wants to investigate [12]. The population of this study is more focused on the SUS vendor in SMSO which consists of 150 suppliers. However, from 150 suppliers, 108 suppliers were selected to be the sample size.

### Sampling Technique

The sampling technique that is applied in this study is stratified random sampling. According to [13], stratified random sampling is a selection of a sample that represents different group or level of a population which related to the topic of the study. In this study, this sampling technique is used to ensure a high degree of representatives of all the strata or layers of the population.

### Sample Size

For the SUS vendor in SMSO, the population size is 150 suppliers. Out of the population size 108 suppliers have been selected to be the sample size. This sample size was determined based on the calculation by [14].

## ANALYSIS AND RESULTS

The data gathered from the two departments were analyzed using two differential statistical analysis, which include the correlation analysis and Multiple Regression analysis. Based on the correlation analysis in Table 1, the finding reveals that there is positive and linear relationship between the acceptance of SAR-SRM among suppliers with better tracking and centralized procurement. This is shown by the significant value of less than 0.05. Furthermore, the Pearson correlation also highlighted the moderate association between the suppliers' acceptance of SAP-SRM with centralized procurement and better tracking. The correlation value (r) obtained were 0.510 and 0.604 for the respective variables.

Table 1: Pearson correlation analysis

	Acc_SAPSRM	Centra-Proc	Btr-Trac	Improve-Effic
Acceptance of SAP SRM (Acc_SAPSRM)	1			
Centralized Procurement(Centra-Proc)	0.510**	1		
Better Tracking(Btr-Trac)	0.604**	0.619**	1	
Improve Efficiency (Improve-Effic)	0.018	0.061	0.141	1

\*\*Correlation is significant at the 0.01 level (2 tailed). Sample size = 108

### Regression Analysis

A Linear Regression Analysis using the Step-Wise method was conducted in order to determine the combined effect of all three independent variables on the acceptance of E-SCM among suppliers at Shared Materials Services Organization (SMSO), PETRONAS. The regression analysis generates the following model.

$$\gamma = 1.782 + 0.468 X_1 + 0.220 X_2 + e \quad (1)$$

where  $X_1$  = better tracking,  $X_2$  = centralized procurement and  $e$  = random error

Table 2 shows the coefficient of determination ( $R^2$ ) between the independent variables (Centralized Procurement and Better Tracking) with the dependent variable (the acceptance of SAP SRM among suppliers) equal to 0.395. This result indicates that 39.50% of the variation in the acceptance of SAP SRM among suppliers is explained by the changes in centralized procurement and better tracking. The remaining 60.50% of the changes in the acceptance of SAP-SRM among suppliers are explained by other variables.

Table 2: Summary of regression analysis of predictors on the acceptance of E-SCM

Model Summary							
R	R <sup>2</sup>	F	Sig	Dimension	Beta	t	Collinearity Statistics
0.628	0.395	34.26	0.000*	(constant)		5.669	
				Better Tracking	0.468	4.839	0.617 1.621
				Centralized Procurement	0.220	2.281	0.617 1.621

\*Predictors: (Constant), better tracking, centralized procurement

### DISCUSSION

The study is conducted to measure the direction and strength of the relationship between supplier's acceptance of SAP-SRM and the efficiency of the system, better tracking and centralized procurement among suppliers. Moreover, through this study, it is hoped there was better understanding of the elements/factors that have the greatest impact on the new integrated procurement system.

The Pearson Correlation analysis indicates that there is a positive and a moderate relationship between both centralized procurement and better tracking on the acceptance of SAP SRM among suppliers of PETRONAS. Comparing the two independent variables, better tracking has a stronger relationship with the acceptance of SAP SRM as indicated by the Pearson Correlation value of 0.604. Similar results were also obtained using the Linear Regression Analysis as indicated by the higher  $\beta$  value of 0.468 for the variable.

Based on the result of the statistical analysis, the researchers conclude that due to the new implementation of the system at PETRONAS, it shows that the system does provide better tracking and centralized procurement for all the suppliers. The new system however has not been practiced long enough by the company. Therefore, many suppliers tend to disagree that SAP SRM may improve efficiency. The company, SMSO were incorporated on 1st January 2013; hence the E-SCM system has only been used for 3 years. Due to the short period, suppliers of SMSO may not be able to understand every detail of the system, which contribute to the delay in effective implementation of the system. In the future, it is suggested SMSO can improve their performance by helping their suppliers to understand the benefits of the new integrated system by fully understanding how to use the electronic Supply Chain Management (E-SCM).

### CONCLUSION

The results of the regression analysis revealed that centralized procurement and better tracking have a significant relationship towards the acceptance of SAP SRM. In this respect, PETRONAS will be able to decide whether they should assist the suppliers in order to minimize any problem and to improve the efficiency of the

system. Thus, suppliers may be able to use the result of this study as guidelines when predicting what will happen while implementing this new system and what actions needed to be taken to avoid any difficulties.

The Malaysian government may also benefit from this research in order to improve its procurement activities. In general, the federal government is involved in many procurement activities. The results gathered from this study can guide the government to make better decision and reduce conflict when handling huge numbers of tender or projects. In terms of data collection process, more interviews can be conducted if more data collection time is available. Interviews can be conducted with one condition, the person has to be an SAP SRM user. In addition, interviews with more contractors or companies will provide a more comprehensive results.

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