

EFFECTS OF PROCESS ANALYSIS AND SIMULATION TOOLS TO IMPROVE THE PURCHASING PROCESS AND PRACTICE OF TYPICAL INDUSTRIAL

Hossein Ebadati ^{1*}, Seyed Yahya Seyed Danesh ², Esmail Malek Akhlagh ³

1 -Department of Management, Science and Research Branch, Islamic Azad University, Guilan, Iran. (Corresponding Author)*

2- Department of Industrial Management, Payam-e-Noor University, Rasht Center, Rasht, Iran

3- Department of Business Management, University of Guilan, Guilan, Iran

Abstract:

The purpose of this study was to demonstrate the capabilities of computer simulation techniques to improve the process of buying a system and thereby improve organizational performance. The case study started by using the model the process of purchasing and logistics systems modeling BPMN standard computer-based industry group typical processes and the global pattern APQC the model and then transferred the above model to a computer simulation to express the resources, time, cost and queues waiting in process for resources and finally with analysis and design solutions for improving in the proposed scenarios are selected the ones that have the best performance. This research is trying to show the importance of processes improvement in order to improve the organizational performance.

Key Words: Simulation, Improve of Buying Process, Organizational Business.

Introduction:

In recent years, dealing with challenges of the rapidly changing business environment, has been caused to show process that is due to Interoperability internal factors and their interactions with environment, the complexity of many. So organizations adapt to today's complex environments show business process management capabilities more interest. In this regard, existing view is that performance management is an essential component in the implementation of Business Process Management (BPM). Business process management and resource management of such systems is dependent on a number of evaluation systems, setting goals, flow control and corrective action permit. Business process management systems are able to support business process management.

The problem Statement:

How to improve the buying process as an important support for business processes without cost and risk organizational changing the processes and implementation of new processes to be tolerant organizational is the issue that this research followed. To answer this question this study examines how to improve the buying process as one of the important processes of business support organizations by using simulation models and with definition and criteria to determine the situation and take control of the process conditions, identify potential problems and fix them if possible, planning and operation of programs to improve the process. Defining indicators to measure

performance and effectiveness and efficiency of processes can be calculated and having real data to compute the key parameters, planning, implementation, monitoring and corrective action to occur. This case is the only application performance management and process improvement, support proper terms to find reliable information and their results increase. In order to obtain an accurate picture of your current situation must be properly designed and defined appropriate indicators of measurement. By measuring the amount of these parameters the present situation can be target and to achieve the expected goals designed programs coherent. With continuity measuring the values of the indicators in subsequent periods completely that can get in the way we are moving how successful it is and how our goals have been reached. Considering that this study was carried out in Kerman Tire and this company is a manufacturer of tires based APQC for two years before their existing processes and BPMN modeling tool is the developed model. Due to the expense and risk organizational the current processes and implementing new processes will not tolerant by using simulation models to support decision-making processes as a management technique and risk of decision-making process has been considered by evaluating and analyzing various strategies designed to improve system.

1 – 1.: research Concept Model : The model used in Simulation and Process Analysis

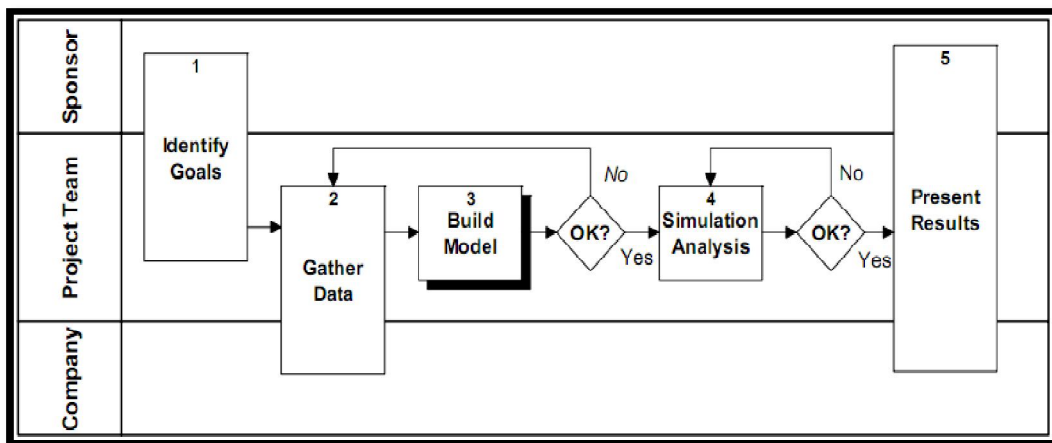


Figure 1 : Diagram of Simulation Conceptual Model

Model and methodology of process analysis by simulation tool Is formed of five stages :

- 1 . Setting Goals , Expectations and Scope of the project that are Doing.
- 2 . Collect t associated with the process data Through interviews and measurements (Time, costs, resources, waiting time for resource)
- 3 . Draw a model of the current process That is representative of real world after simulation.
- 4 . use of analysis method of what-If with multiple changes and the observed changes.
- 5 . Offering simulation results and Proposal for points change of process that have improve Potential.

Theoretical framework for research on process improvement through simulation:

In 1997, Kathy Njr and her colleague's in valuable projects review a number of methodologies and approaches to reengineering and with an inductive approach achieved a comprehensive

methodology for reengineering business processes. "Activity - stage" methodology framework, provide structured set of guidelines or principles that enables analyst to derive ways to alleviate these concerns (Kathy Njr et al. 1997).

Authentication and validation determination of simulation models :

Authentication and validation determination used for Ensure the accuracy of underlying assumptions and model simulation and also used for Problem Statement that Purposes intended are reasonable or not. and Flow Chart models are authentication and consolidation in first of APQC process model and BPMN modeling standard , Logically and by Entourage and process owners. Authentication and determination of Credit consecutive is part of the recovery process that Use combination of Judgment and objective methods .

Judgment Tests : In this tests people that Specialize in one or more aspects of the system, provide their opinions about the simulation model and it behavior. For judgment Tests in this research used of different technics Such as tracking Institutions among simulation various departments or check of simulate variables at different times Because be seen as the Were nominated have worked or not .

Objective Tests: This test deals to compare between data from the system actual behavior and corresponding data generated by the simulation model. In fact, this issue will be discussed that Simulation is accurate enough to be , to be able to create good predictive when the input data are real data.

Proposed models for improvement:

After verification and validation of simulation models, at this stage, as well as interviews with process owners who will have a major role in the design process was carried out and Problems, barriers, reform and improvement, and comments were gathered. Key activities of the owners and beneficiaries of this research were conducted at the Department of Procurement and obstacles to the implementation of each activity in terms of the specified process .The main problems with this process, during the time of the acquisition process and therefore increase the cost of capital is a dream, and there are other restrictions on the buying process has added to the problem, among these constraints can note that we can not mechanized, Being part of the process & buying. Other problems have been identified in this process is the existing of bottlenecks during the process. The most important bottlenecks in the file officers lined up purchase orders and purchase orders to wait for the release of manpower to do it. At this stage, the Davenport procedures regarding proposed changes by the stakeholders in the process will improve the process performance is presented.

It offers owners and operators to improve the returns process and removal of bottlenecks and problems with extra activities long before they were known to be related. According to the theory of Davenport offered suggestions for improvement, even partial, is firstly indicate that the process is fully understood and modeled. Second, it suggests that the scope and effectiveness of re-engineering projects with broader and more comprehensive projects to improve and thirdly, to say the very comprehensive and effective process reengineering has been proposed that the recovery process for all types of opportunities exist for improvements to be ignored.

Table 1 : List of processes and the current status of the simulation

Process Name	Elapsed Time	Count	Avg Cycle Average real-time process (Weeks)	Avg Cost Average process Implementation real-time (Weeks)	Time-Weighted Average Resource	Total Transaction Waited Count
Identification of new suppliers	25.71	6	4.32	100500.00	16.21	38
Updates records Suppliers	24.00	5	21.68	22999.28	4.84	4.84
Planning and control of raw material	25.71	25	4.25	54221.78	22.08	156
Inquiry domestic suppliers	64.18	8	47.28	3256163.41	43.30	843
Delivery of raw materials from suppliers	55.19	13	25.82	304487.53	19.59	331
Performa received from suppliers	51.43	33	10.64	16542.76	9.50	61
Foreign purchases of raw materials (foreign order)	51.43	16	22.32	219510.22	25.33	155
Foreign purchases of raw materials - substances discharged	51.43	33	10.70	26333.74	7.93	265
Order of internal parts	25.71	3	34.43	1023475.74	28.46	419
Order of internal components - Factory	51.43	10	34.54	69363.52	2.54	65
Order parts for foreign	24.00	14	169.21	90982.76	8.90	215
Apply to exchange with other tire makers	51.43	151	57.06	16382.56	13.67	397
Auctions and sale items for hire and waste	24.00	13	51.46	82754.33	5.02	140

The processes simulation results of purchasing process Group at the available situation:

The output results are summarized in Table 1 reports the main items on the current status of the simulation process of buying groups is given in Table 1. The following table was prepared on the basis of improved processes and candidates but the study found that the improved performance in some scenarios, most of these processes have been partially and the need to create an improved model for them Therefore, in this study an improved model of the process which brought considerable improvements they have made a huge impact. In the next section an example of process improvement with the present situation and they have been improved model. The analysis and comparison of simulation results and outputs scenarios: Achieved by improving the discharge.

process of simulated materials (Customs Administration) with:

- 1 - Delete confirmation time by the system to process requests.
- 2 - Add the toll of shipping and the results of the average discharge of materials (Customs Administration) for the buying any foreign material that may be reduced to 10.70 days to 7.34 days.

Table 2 : Average time of process implementation in two scenarios of simulation

As Is Time Report

Transaction Statistics (Days)									
Count	Avg Cycle	Avg Work	Avg Wait	Avg Res Wait	Avg Block	Avg Inact	Avg Serv	Min Cycle	Max Cycle
33	10.70	1.29	9.41	0.00	4.65	4.76	5.94	8.06	14.99

ime Report

Transaction Statistics (Days)									
Count	Avg Cycle	Avg Work	Avg Wait	Avg Res Wait	Avg Block	Avg Inact	Avg Serv	Min Cycle	Max Cycle
48	7.34	1.30	6.04	0.00	2.26	3.77	3.57	4.34	12.79

As Is Cost Report

Transaction Statistics (Rial)						
Count	Avg Cost	Avg Lbr Cost	Avg Eq Cost	Avg Oth Cost	Avg Std Cost	Avg OT Cost
33	26333.74	26333.74	0.00	0.00	22579.61	3754.13

Improvement Cost Report

Transaction Statistics (Rial)						
Count	Avg Cost	Avg Lbr Cost	Avg Eq Cost	Avg Oth Cost	Avg Std Cost	Avg OT Cost
48	26476.63	26476.63	0.00	0.00	22478.58	3998.06

Analysis of results and simulation outputs and compare scenarios :

By improvements that have arisen the simulated in process of materials clearance (Customs) through:

- 1 . Requests confirmation time by system to process.
- 2 . Adding funds for pay shipping complications .

And the results of its, average time Clearance of materials(Customs) for each item of purchase of foreign first material that reduced from 10.70 days to 7.34 days .

In result, in total time Clearance reduced 88.1 day in year that given that capital is not used in the period cited be Save a lot to calculate the annual interest of 24% .

Apart from the improvement of above is produced other improvements in number of shopping that will be performed of 33 to 48 shopping case in year and also reduce personnel costs of executive this process.

The following table show list of Improved processes and summary of improve amounts in each of the four items : Process time , Cost of process implementation , used of resources and waiting for used of resources with amounts of before recovered .

Table 3 : List of Improved processes and summary of improve

Total processes that can be improved	Count	Average Cycle (day)	Average Cost (Bial)	Time-Weighted Average Resource (week)	Total Transaction Waited Count (hour)
Inquiries from domestic suppliers (before improved)	13	47.28	3256163.41	43.30	843
Inquiries from domestic suppliers (after improved)	13	28.00	2162960.59	21.42	509
Performa received from suppliers (before improved)	33	10.64	16542.76	9.50	61
Performa received from suppliers (after improved)	33	8.83	15732.84	9.50	61
Foreign purchases of raw material - material clearance (before improved)	33	10.70	26333.74	7.93	265
Foreign purchases of raw material - material clearance (after improved)	48	7.34	18202.68	11.73	380
purchases of internal components - Factory (before recovery)	10	34.54	69363.52	2.54	65
purchases of internal components - Factory (after improved)	10	33.94	41390.38	2.10	45
Total improved amounts in the four process of high	15	24.96	1130116.89	18.52	241
Average improved amounts	5.5	6.44	282579.22	11.18	248

It should be noted that, recovery values of cost listed in table3 only is related to the cost of the implementation process and it is not include the costs of improvement that will make the results of process performance and much broader and more significant . Also in this table has been shown that percentage of hold resource reduced average 11.18 week and stop and waiting for resources has improved average 248 hr that it Improvements are effective in decrease of actual execution time.

Conclusion:

The results of this study Show Process vision Necessary in design organization process for reach to goals and Characteristics of the process. Remove add activities by Aimed reducing at purchasing process time , have many roles in enhance process performance and sleep decrease of capital expenditures and also is accompanied Client Satisfaction. Instruments used in this study is Calculated The cost of each process Based on the use of machine resources or manpower and Provided in the report analysis of output that using the it Action is for select the most cost-efficient purchasing process . Other notable and important points of Simulation , analyze and improve the process of buying it is that in business new model , hierarchical communication and decision unilaterally no place of their pervious and new issue in organizational change and process improvement is more delegation , Participation in decision-making . in this researches , this changes of organization has caused more delegation to general manager by the CEO . And, has caused most importantly Less hierarchical relationships to owners of the shopping process to make decisions about Foreign supplier selection for Implementation of their defined duties. Although each delegation may be associated with the errors and irregularities in First and has caused cost to the organization but May With control procedures reduced this mistakes . Meantime this costs Is very small against great interest that occur In effect delegation . Finally,

procedures used in this study can be used for development process models and as a result, Other process improvement projects and or reengineering buy process improvement.

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