



Provide and develop a performance evaluation model based on process management system (Case Study: Nouri (Borzouyeh) Petrochemical Company)

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Abstract. In today's competitive and turbulent situation, economic institutions tend to have the wise flexibility and agility in order to improve productivity and enhance competitive power. Efforts in smart performance requires a coherent system for evaluating the performance of organizations. The importance of performance measurement have made to spend considerable time, energy and human and financial resources to evaluate the analytical of their performance at individual, organizational units, processes and organization in order to achieve the mission and goals. Therefore, the first priority is to determine the criteria and approval of the proposed standards. Then identify processes and related indicators, end the use of the model, the performance of the organization studied, was also determined. This research is conducted in Petrochemical Company (Borzouyeh). The results of this study could be used to evaluate the performance of other companies and organizations that help to improve their productivity.

Keywords: Performance Evaluation, Process Management Systems, Planning, Improving Productivity, Continuous Improvement

INTRODUCTION

Nowadays changes in the environment in which organizations continue to exist are very broad. In order to establish discipline in such circumstances, environmental changes should be detected and planning should be carried out to enhance productivity and achieving organizational goals.

To successful implementation of the program of improvement and the pursuit of continuous improvement in organizational performance, information on the current situation of the organization is important. Also, in the many of the management issues, the organization is likened to the human body. Because the organization is dynamic and alive. As a prerequisite of any improvement in the treatment of the body, conducting an experiment of the human body and the accuracy of these tests is more and more improvements and more effective treatment, in the case of move towards reform and development organization, fault finding process is the same ruling and try to understand the problems and limitations with this process as a barrier that may prevent the organization on the path to excellence.

The best solution to overcome problems and improve organizational processes and the effectiveness of processes, which ultimately increases the productivity of the organization is using performance evaluation models based process management system.

This model is based on a process approach based on process management system and due to the nature of the series of processes is value creations, facilitated by valuable information from monitoring and measuring processes and accurate assessment of its performance.

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With the introduction mentioned that the study in question that it is designed with a variety of performance appraisal systems and models, underlying business processes and of the organization lack of a model with respect to the discussion of process maturity, provide highly detailed assessment of performance is required.

The importance of this issue, since the new management comes in attitude, focus on alternative processing approach into functional activities. In this attitude of all the activities are placed the organization within the framework of a certain process. Mentioned organization's processes are leading the way consent of the parties concerned. Therefore, any move formed to improve performance, increase the efficiency of processes. (Rezaei, 2003) Also modeling of processes in any organization is one of the important preconditions for the development of the organization. Basically, organization growth and development is not simply a matter of increasing input and output capabilities; but also the actual development of managerial capacities, skills, decision-making and communication is more important. One of the most important steps in the development of managerial and organizational capacities is identification, mapping and related activities in standardization processes. Identify processes with skills profile of strengths and weaknesses can be useful and effective plans to provide capacity development. (Hosseini and Zargar 2004)

Another reason for the importance of developing such a model is that an organization's competitive advantage in the global economy in the first phase of implementation strategies and resources of the organization's expenditure. (Rafizadeh and Ronagh, 2013) In this mode the evaluation and implementation of business processes, organization, implementation strategies and optimal use of resources is achieved.

As also shown in Figure 1, in every organization, according to Michael Porter's value chain for synergies and create value for clients and their satisfaction, should be organization processes, as rings, a chain connected to the consumption of inputs required to convert the desired outputs. On the other hand, given that the purpose of the performance appraisal system, pushing all managers and staff to the successful implementation of the strategy. (Sadeghi, 2009) Therefore correct implementation organization strategies to achieve the vision outlined edited except by the use of business processes, it may not be feasible.

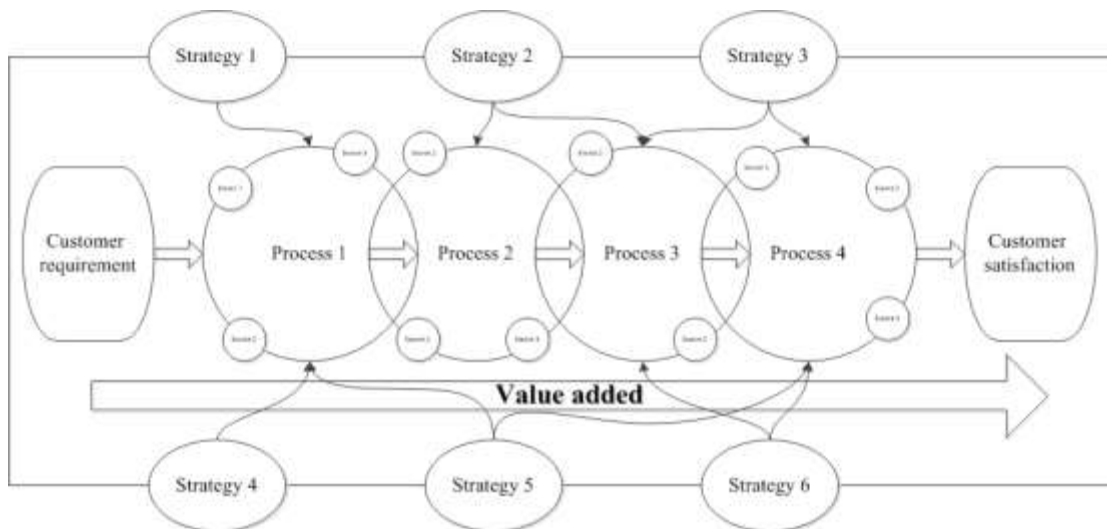


Figure 1. The relationship between Organization strategies and processes to create value for customers.

This research aims to provide a suitable model for evaluating the performance of organizations underlying process management system and business processes of the organization.

Reviews of the history of research

"Performance evaluation" term has many definitions. In order to understand the emergence of the phenomenon defined or is required to ensure a common interpretation and understanding. Evaluation is also

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exempt from this rule. It should be mentioned due to the relative similarity, the concept of evaluating the performance of the employees, then in the use of resources and, ultimately, to be defined in terms of organization.

Werder and Davis believe that the individual or group performance defined evaluation process in relation to the implementation of duties. Performance evaluation in the use of resources in the form of performance indicators expressed. If in simplest definition, attributed to know output performance, performance appraisal system, in fact, the performance of management decisions on the optimal use of resources is measured.

Performance evaluation is usually synonymous of the effectiveness of activities in the organization. The order of effectiveness of the objectives is effectiveness of programs, activities and operations. (Pakravan and Khoobyari)

Performance evaluation is an ongoing process in which the goals is measured. In this measurement, efficiency and effectiveness of resources used and work processes, quality of production (output processes) or services and programs is examined. (IranZadeh, and Barghi, 2012)

In general, performance evaluation is use of complex multi-dimensional of performance indicators. The order of data collection is multi-dimensional and non-financial indicators and indicators of retrospective and prospective, as well as internal and external factors involved. (Olia et al., 2010)

History of performance evaluation in the form of primary and first goes back far past. In fact, when human life begins and phenomena in the form of elementary division of labor between the members was destined to be considered a subject of evaluation. During this period there have been initial performance evaluation form, so that successful people were honored to receive an award and possibly promotion. This method assessment is based on subjective judgment and personal responsibility was being accomplished all that in general terms and in terms of good and evil was expressed. Consistent with the passage of time and the complexity of tasks and determine more expectations and demands, performance evaluation and coordination in order to adapt to continued growth and development path. Assessment system widely both individual and organizational level since 1800 in Scotland by Robert Owen was in the textile industry. The use of wood in different colors, in order to accept or reject manufactured goods, in fact, is the assessment of the quality and output. White color symbol of excellent performance, good performance symbol yellow, blue and black icon symbol moderate very bad performance on the performance of the individual and ultimately was being used. (IranZadeh and Barghi, 2012)

Evolution of performance evaluation can be divided into periods:

1850-1925: Development of Cost and Management Accounting

1974-1992: Development of multi-dimensional performance measurement frameworks

1992-2000: Development plan strategy, business models and cause and effect diagrams

Performance evaluation Models can be divided into two main categories:

- Traditional performance evaluation systems
- Modern performance evaluation system

Traditional performance evaluation system is based solely on financial measures that it creates many problems for enterprises. Deficiencies of traditional performance evaluation system led to a revolution in performance management. So that researchers and users to create the systems that addressed the objectives and the current environment and thus different processes for different organizations were created. Also,

many frameworks was suggested to support these processes, help organizations to assess properly the performance. (Karimi, 2006)

In short, the difference between the two systems is presented in Table 1: (AzadiKhah Salimi, 2008)

Table 1. The difference between traditional and modern systems of performance evaluation.

Modern system of performance evaluation	Traditional system of performance evaluation
The emphasis on different aspects of evaluation	The emphasis on the evaluation of financial
The emphasis on performance evaluation processes	The emphasis on performance evaluation
Oriented strategy (focus on the direction of operations and strategies)	Event-oriented (focus on stories as a single)
Past and future	Retrospective
Emphasis on improving	The emphasis on control
Create an atmosphere of trust and cooperation	Create an atmosphere of distrust
Create and foster a spirit of creativity and innovation	Reduce or eliminate the spirit of creativity and innovation
Establish causal relationships stemming problems	Mere attention to problems
Process-oriented (emphasis on achievement of results and the process of achieving it)	Results-oriented (emphasis on the achievement of results)
The emphasis on measurable performance goals and strategies explained	Focusing solely on performance evaluation
Evaluation as a continuous process	Discrete and periodic evaluations

A few of the most recent research in this area include:

Sheikhzadeh (2010) designed a model for the assessment and management of health system performance. In this integration model and balanced assessment of business excellence model, a framework for performance evaluation is provided; because these two models, regardless of their major similarities, has a different origin and can create a good overlap.

Salehi et al. (2011) designed a model for evaluating the performance of bank branches and financial credit and institutions. This model is offered in three of the most important aspects of innovation, attention to customer satisfaction and staff later with a smaller index that is used in the banking industry of the country.

Hosseinpour (211) designed an appropriate model for evaluating the performance of the country's defense research centers with regard to organizational characteristics of these centers based on the balanced scorecard. This pattern formed of 4 major criteria and 17 sub-criteria and 69 indicators. In the proposed model, the balanced scorecard weaknesses including lack of strategy and the process of determining and evaluating the performance of the leader is solved.

Ajalli and Safari (2011) examined the assessment of decision-making using a combination of neural networks to predict performance data envelopment analysis, to evaluate the performance of the provincial gas companies, Initially CCR input-based approach or a multiple model and Anderson-Peterson (AP) for ranking in terms of efficiency DEA model Analysis (DEA) and weaknesses in terms of the calculation model and the separation efficiency. More research, analysis and evaluation of business performance of the neural network approach to predict the performance of hybrid models in the form of data envelopment analysis and artificial neural networks (Neuro / DEA) was used.

Hanafizadeh et al (2012) tried to provide a fusion performance evaluation process model. In this research, a compilation performance evaluation model is proposed in a pharmaceutical company, which specialized functions and processes of an organization has been addressed simultaneously. The mentioned model, by combining the key elements related to the processes and units simultaneously measures the value through processes and units.

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The structure of the Performance Evaluation Model

Evaluate the different approaches of performance shows that the assessment should be commensurate with the growth and development of organizations that meet the diverse and numerous aspects of it. Technological development, the critical success factors in the performance of domestic and foreign competition, the advantages and the quality of goods and services provided by it to the market and customers is one of the factors that should be considered in evaluating performance.

Some of the considerations that should be considered in the development of performance evaluation systems are given in Table 2. (Jafari et al., 2011)

Table 2. Key considerations for the analysis of a performance evaluation system.

Consideration	Level 1, 2 and 3
<ul style="list-style-type: none"> • What criteria are used to evaluate performance? • What is the purpose of the criteria used? • What is the cost of doing business? • What benefits are there? 	In the case of evaluation criteria (Level 1)
<ul style="list-style-type: none"> • Do all relevant considerations are covered (internal, external, financial and non-financial)? • Do measures in connection with the evaluation of growth and development of the system is introduced? • Do criteria associated with short and long term goals of the business is well introduced? • Do has been criteria at all levels of horizontal and vertical integration? • Do not contradict each other criteria? 	In the case of performance evaluation the system itself (Level 2)
<ul style="list-style-type: none"> • Do criteria will strengthen the organization's strategy? • Do standards and assessments aligned and harmonized organizational cultured? • Do these system of identification (identification) and reward compatible? • Do these evaluations and criteria to meet customer needs attention? • Do these evaluations and criteria focused on what is happening in the market? 	In the case of relationship between system with the internal and external environments (Level 3)

Also, based on the evaluation of the University of Michigan for an evaluation, the following six steps are recommended:

1. The development and adjustment of evaluation criteria
2. Determining the relative importance of axes and indices
3. Determine performance standards
4. Measure the actual performance
5. Compare the index and performance standard
6. Preparation of analytical reports

In conducting this research, we have to take the issues based on the above model. (Salehi et al.)

As with previous studies found that none of the models based on process management system does not evaluate the performance of the organization; therefore, we propose the following model can be used to obtain a comprehensive assessment and detailed performance.

Research method

This study consists of two stages. in the first stage, design and modeling of the performance evaluation process is done based management system; based on purpose of the second phase of development and modeling and model testing, validation and accreditation is carried out; based on purpose of the survey

design and data collection point. The information needed to carry out research using a variety of methods, athletics, library, observation, interviews and questionnaires and in some cases is obtained.

Conceptual Model Research

Steps and trend doing research is shown in Figure 3.

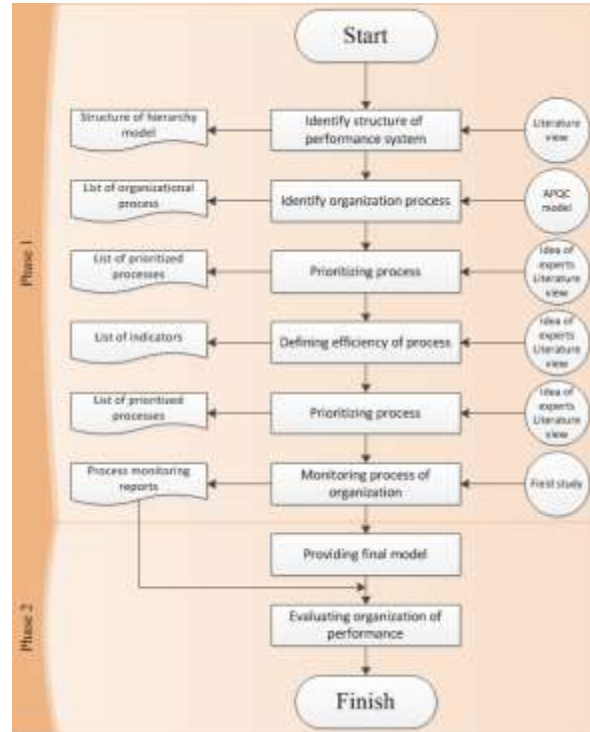


Figure 2. Conceptual model of research.

Statistical Society

Society group is people that have a common trait that the researcher is addressed. Society may be included everyone in a particular group or some of the limited group. (Best, John W, 2011, p. 24) Also Sigismund defined a Statistical society as "a set of individuals or the Statistical Society the units that have at least one common trait. Usually in each study, the studied society is a Statistical Society that the researcher wants to study about the characters." (Improve the performance of the organization Thesis) Statistical Society of this research are experts in the field of business processes to determine the prioritizing and prioritization processes and related indicators. Operational definition of an expert in the study is an individual who has enough experience in the business processes field.

In some cases, there are not more than 3 or 5 experts in this regard is that there is no problem and the result is quite scientific and content; experts have completed the questionnaire and does not need to have a high volume of samples. (Forums statistical analysis and data processing) Also Statistical Society models is business processes of Nouri Petrochemical Company (Borzouyeh).

Preparation of questionnaires and distribution

How to set up this questionnaire so that the importance of each criterion from the perspective of population is polled. For this purpose, as stated earlier, to identify the importance of each of the identified measures, a scale of 5 degrees (very least important, least important, moderate, important and very important) is used.

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To check the status of the provided questionnaire, as well as preventing wide distribution of faulty questionnaire in the Statistical Society and reduce the rate of incompatibility, Pilot implementation questionnaire has been conducted between 3 people of personnel of Statistical Society and opinions and views are collected about the general questions and questionnaire. The main points expressed in the questionnaire was pilot implementation of:

- Some of the questions are unclear.
- Some of the questions are very similar.

To overcome the expressed disadvantages, changes have been done in inventories and standards incomprehensible was re-revised or deleted and similar measures have been merged. This action was done electronically and questionnaire a link was sent to the email address given Statistical Society completed application and a questionnaire. Also in this email, the purpose of collecting information and cooperation was mentioned. Out of 20 questionnaires, 16 were returned after completing. 1 questionnaire deleted due to a failure in the completion and 15 questionnaires were used for the analysis. Figure 1 shows the distribution of the questionnaire and the returned results.

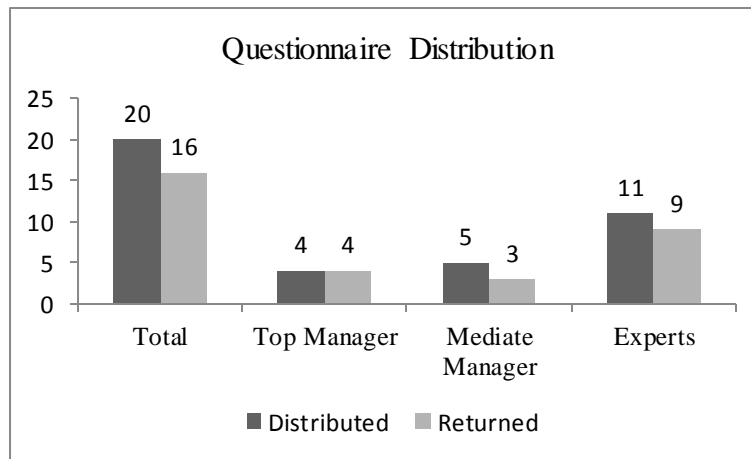


Figure 1. Distribution questionnaire in the Statistical Society and returned results.

In the next stage by using the Friedman test, data collected through a questionnaire was analyzed.

By analyzing data collected through questionnaires and using the Friedman test and SPSS * software, the following tables were obtained. In Table 3 (Table Descriptive Statistics) statistics mean, standard deviation, minimum and maximum rates are calculated for each of the ten criteria. In Table Ranks (Table 4) and Table Test Statistics (Table 5), respectively, the average rank of each of the ten criteria and the test result is shown.

n: size of sample

Chi-square: chi-square statistic

df: degrees of freedom

Asymp. Sig: significant level test.

distributed

Returned

* Statistical Package for the Social Sciences

If significance test is less than 5%, 1st assuming is concluded. This means difference between the samples. Otherwise, the null hypothesis is verified to show no difference between the samples.

Table 3. Descriptive Statistics.

	N	Mean	Std. Deviation	Minimum	Maximum
Increasing profitability	15	4.47	.834	2	5
Realizing strategies	15	4.20	.862	3	5
Reducing costs	15	3.73	.704	3	5
Increasing productivity	15	4.40	.737	3	5
Increasing key beneficiaries' satisfaction	15	4.27	.594	3	5
Increasing quality of produce	15	3.93	.961	2	5
Increasing benefit of current and future	15	4.27	.594	3	5
Expertise of organization	15	3.93	.594	3	5
Increasing agility of organization	15	3.80	.775	3	5
Increasing job satisfaction in employees	15	4.00	1.254	1	5

Table 4. Ranks.

	Mean Rank
Increasing profitability	6.83
Realizing strategies	6.03
Reducing costs	4.07
Increasing productivity	6.63
Increasing key beneficiaries' satisfaction	6.03
Increasing quality of produce	4.87
Increasing benefit of current and future	6.00
Expertise of organization	4.67
Increasing agility of organization	4.30
Increasing job satisfaction in employees	5.57

Table 5. Test Statistics^a

N	15
Chi-Square	19.112
df	9
Asymp. Sig.	.024

a. Friedman Test

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Due to the high output, the end result is due to the significant level of the test is less than 5%, assuming that there is a difference between the criteria for prioritization of business processes.

- $\left\{ \begin{array}{l} H_0: \text{The treatments have identical effects} \\ H_1: \text{At least one treatment is different from at least one other treatment} \end{array} \right.$

Accordingly, increased profitability criteria obtained the highest score and measures to reduce costs obtained lowest score. The results of the ranking criteria is shown in Table 6.

Table 6. The results of the ranking criteria for organization prioritization of business processes.

Row	Criteria	Ranking
1	Increased profitability	6.83
2	Increase productivity	6.63
3	Implementation of strategies	6.03
4	Key stakeholder satisfaction	6.03
5	The increased interest of present and future	6.00
6	Increased job satisfaction	5.57
7	Increase product quality	4.87
8	Technical expertise of the organization	4.67
9	Increase the agility of the organization	4.30
10	Reduce costs	4.07

Finally, according to the ranking points, two standard processes were chosen as the priority final criteria listed in Table 7.

Table 7. The final list of criteria for organization prioritization of business processes.

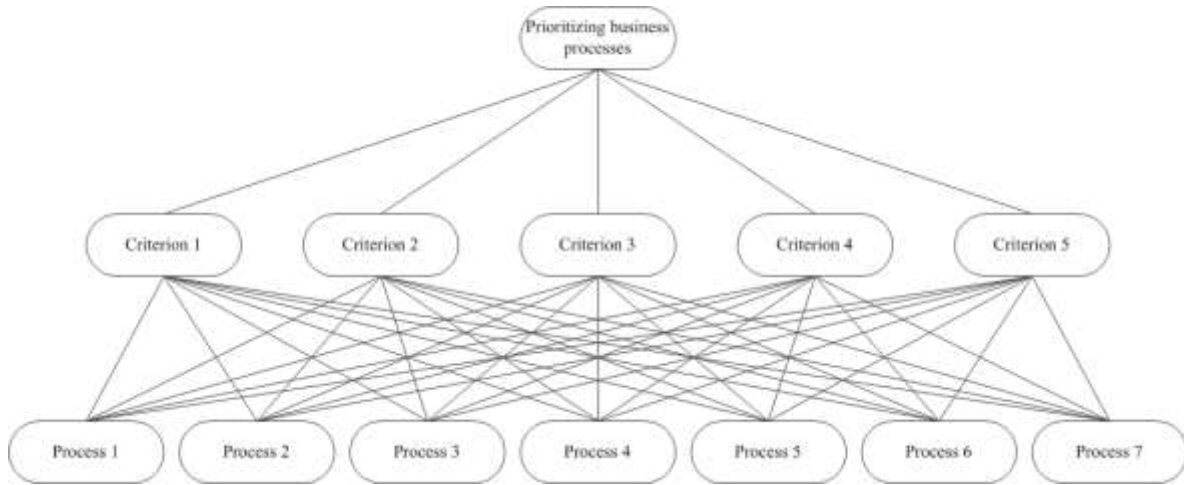
Row	1 st criterion	Row	2 nd criterion
1	Increased profitability	2	Increase productivity

Business processes organization prioritization

After determining the final criteria using AHP method of multi-criteria decision makings is the most important techniques, business processes of organization are prioritized. The first step is to draw a tree hierarchy. After doing this for each of the criteria, a matrix is formed and organization and business processes are compared and local priority is determined. Next stage is to calculate the priority of each criteria that form a matrix, the ultimate criteria for prioritization of business processes is also pairwise comparing the priority of each criterion is achieved. Then by integrating the processes relative priority and criteria a priority, Overall Priority each process can be obtained.

As mentioned, the first step in the process of hierarchical analysis is to create a graphical representation of the problem in which the objective criteria and options are shown. (Ghodsipour, 2011) Figure 3 shows a graph of hierarchical criteria for prioritizing business processes.

Figure 3. Diagram of business processes hierarchical prioritization criteria.



In the process of hierarchical analysis of the relevant elements in each level is compared to a higher level and the priority is calculated, these priorities are called relative priority. Then with combination of relative priorities, the overall priority of each option is specified. All comparisons in the process of hierarchical analysis is done as a couple. In this comparison, decision-makers use oral judgments, so that if *i* is compared with element *j*, decision-maker answer importance of *i* on the *j* based on the following:

- Fully preferred or very important or quite favorable
- Preference or importance or desirability of a strong
- Strong preference or importance or utility
- Reference or a little more or a little bit better
- Preference or importance or utility of the same

These judgments were converted to qualitative amount on scale 1 to 9 and are specified in Table 8.

Table 8. Preference value for paired comparison.

Oral preference	Numerical value
Extremely Preferred	9
Very Strongly Preferred	7
Strongly Preferred	5
Moderately Preferred	3
Equally Preferred	1
Preferred between above distance	2,4,6 and 8

The second step is to prioritize the organization's business processes and specify the relative and overall priority of each process. The relative priority is achieved of paired comparison matrix, while the overall priority is the final grade calculated by combination of relative priorities. So matrices formed separately, organization business processes based on each of the final standards are compared with each other as a couple. To calculate the priority of any standard process, various methods such as:

- Ordinary least square method
- Logarithmic least square method
- Special vector method
- Arithmetic mean method
- Approximate methods

Simple arithmetic mean method is used in this study. This approach include three steps below:

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- **The first step:** values of each columns is summed.
- **The second step:** Each element in the matrix compared to the couple divided their column has achieved normalized paired comparison matrix.
- **The third step:** The mean (average) elements in each row of the matrix is calculated. These average value is an estimate of the priority of each process.

After calculating the priority of all the processes to all criteria, the priority of criteria should be specified. In other words, the share of each of the criteria in prioritizing business processes should be specified. To do this, we need to compare and test criteria in paired mode and these criteria are evaluated by relevant experts. Therefore paired comparison matrix form the desired options, and using the arithmetic mean, calculated priority criteria.

Now the priority of each of the priority criteria to purpose business processes (business process priority), and the priority of each process to the criteria is calculated. However, by combining these priorities, final priority, each process can be obtained. Overall Priority of each process is achieved by multiplying priority of each in the priority of relevant process. (Ghodsipour, 2012)

$$W_i = \sum_j w_{ij} \times v_j$$

In which:

w_{ij} = j criterion relative I process priority

v_j = j criterion priority

As mentioned in the previous section, monitoring and measuring indices are four processes that can be divided into two main categories:

- Effectiveness indicators
- Performance Indicators

Indicators of effectiveness, output and outcome indicators related to the organization processes and performance indicators, indicators inputs and process are related to business processes.

Effective indicators evaluate the achievement to the purpose and results are show optimal use of resources for the effective performance indicators; thus, because degree of effectiveness of indicators designed to focus on their goals, are more important.

According to mentioned discussions, prioritization of indicators for monitoring and measuring processes is done based on the importance of each indicator is specified in Table 9:

Table 9. The degree of importance of indicators.

Importance degree	index
Very important	The output index (index of effectiveness)
Important	Development index (index of effectiveness)
Average	Sources Index (Performance Index)
Low importance	Input Index (performance index)

In this section, AHP method is used to prioritize indicators and measuring processes. I.e., forming paired comparisons matrix, compared pairwise indicators each process and the priority of each index can be obtained. Given the importance of each indicator is shown in Table 9 and coordinating the allocation of points in different processes, scores compared with each other in paired comparison matrix is taken into account as follows:

- Comparison of output index (INDEX very important) input index (Index least important): **9**
- Comparison of output index (INDEX very important) resource index (average index): **7**
- Comparison of output index (INDEX very important) and outcome indicators (index of important): **5**
- Comparison of development index (index important) with input parameters (parameters least important): **5**
- Comparison of development index (index important) resource index (average index): **3**
- Comparison of resource index (average index) Input Index (Index least important): **3**
- Comparison of resemble each other index: **1**

Assess the actual performance

Monitoring the indicators to and compare actual performance with the acceptance criteria is the main action in the proposed model. At this stage the data have been collected and indices are calculated. Accuracy is important in calculating the index, calculated as the basis for rating performance, the accurate calculation of the index.

Monitoring

Culture is defined in Webster monitoring as follows:

Monitoring is to check or regulate the performance of a machine

That the purpose of the analysis is monitoring the efficiency of the system that this analysis, statistics, figures are results of the measurement.

Therefore, monitoring a process is to control and monitor the process to ensure the accuracy and integrity of the process and its main characteristics and to identify weaknesses of the processes. So whenever an organization wants to show ability using descriptive and dramatic, monitoring tools is used.

Measurement

There are different definitions of measurement term which can be found in the national and international culture and terminology all over the world. Even though these definitions are different in detail; but they all involve the basic concepts that measure is known as a process of assigning a value to a physical quantity. In general, if an organization can show index to prove his ability to process numbers the tool is used as a measure. Principally the measurement process begins the process of establishing criteria and standards (Adaie, 2003).

Comparison of standard performance indicators

To compare the performance with the standard for each indicator, the actual performance acceptance criteria determined by comparing the charts of the index map and the achievement of specified goals. From information obtained in this section are used in calculating the score for each indicator.

After collecting data on the parameters of each process, it was time to evaluate the data collected, analyzed and compared to prior periods. To evaluate the collected data, using the following model, the score of each index is calculated. The next stage a coefficient for each indicator with regard to the importance of the process is taken into account. Indicators and factors determined the fuller and more consistent with the reality and the nature of the processes the resulting scores are real. Then, according to the number of process parameters and calculate the total points earned by the total score of each index is reached. The final stage of the process is to calculate the final score of each process and prepared a comparison table in the process is monitored and compared with past periods.

Calculated Points based on the performance evaluation process based management system

Under the proposed model, the final score of organization performance is calculated in the three steps and each of these will be discussed.

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Calculate the rating performance indicators

Start-up and early stage of the method is calculating the score of each index. In this method, the index score is 10 for this scoring three parameters that are taken into account the following points:

being in the range of acceptance (R)	5
Improvement relative to the previous period (I)	3
Continuous improvement process (C)	2
Total	10

- Being in the range of acceptance

The maximum score in this section is 5. If the index is reviewed within accepted in this area will get a 5. However, if the index has been measured outside the acceptable deviation, and number must be used to determine the percentage difference between the proportions of our action.

$$\frac{\text{Accepted criterion}}{100} \quad | \quad \frac{\text{Estimated number}}{S}$$

$$X = |100-S|$$

After determining the percentage difference between the values measured in this period with acceptance criteria, using Table 1 to the scoring action of participation.

Table 10. The score assigned to each zone difference.

Difference zone	Score
%0<x≤%10	3.89
%10<x≤%20	2.92
%20<x≤%30	2.08
%30<x≤%40	1.39
%40<x≤%50	0.83
%50<x≤%60	0.42
%60<x≤%70	0.14
%70<x	0

- Improvement relative to the previous period

Maximum score in the second part is 3. In this section, if the index had improved compared to the previous period and in the effect of this improvement was the final figure for the amount more or less, there is, in this part of the full score, the 3 to be attained. Also, if the index in the period before their ultimate values obtained in the monitoring of this acquisition is the same number as in the previous case, full points will earn. But if the indicators have improved compared to the previous period (ascending or descending) without considering whether or not in the accepted range, using the following proportions relative to the calculation and determination of action to improve participation.

$$\frac{\text{New estimated number}}{100} \quad | \quad \frac{\text{Old estimated number}}{I}$$

$$100 - I = |%y|$$

After determining the percentage improvement obtained by using scoring Table 11, the index is measured.

Table 11. The score assigned to each area of improvement.

Improvement zone	Score
%0<y≤%10	0.08
%10<y≤%20	0.25
%20<y≤%30	0.50
%30<y≤%40	0.83
%40<y≤%50	1.25
%50<y≤%60	1.75
%60<y≤%70	2.33
%70<y	3

In this standard criteria for the allocation of a perfect score of more than 70% improvement compared to the previous period. Otherwise, the ratio obtained improve the rating assigned. Also the indicators compared to the previous period did not recover points in this section is not considered.

- Continuous improvement process

The third parameter scoring system is to assess the continuous improvement of the indicators. According to the figures drawn in this section to evaluate the measured data in the last four legs (3 process) and process improvement obtained, to determine the scoring process. The maximum score in this part 2 which shown in Table 12 are assigned to parameters.

Table 12. The score assigned to each number of improvement process.

number of consecutive improvement process	Score
1 improvement process	0.65
2 consecutive improvement process	1.3
3 consecutive improvement process	2

The next step is to calculate the score of each index. For this, the total points earned by the indicators in three parts together and then taking the ratio of the index, the index is calculated final score.

row score of index $j = R + I + C$

$$PR_{Ij} = R_j + I_j + C_j$$

final score of index $j =$ indicator coefficient $j \times$ Row score of index j

$$FR_{Ij} = W_{Ij} \times PR_{Ij}$$

B- Calculate the Points process performance

row score of process $z =$ Total score of process indicators z

$$PR_{Pz} = \sum_{j=1}^n FR_{Ij}$$

final score of process $z =$ absolute coefficient of process $z \times$ Row score of process z

$$FR_{Pz} = W_{Pz} \times PR_{Pz}$$

C- Calculate the final score of organization performance

Final score of organization = total final score of organization process

$$FR_o = \sum_{z=1}^n FR_{Pz}$$

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Case Study

In order to demonstrate the effectiveness and feasibility of the proposed model, this model have been used and tested in Nouri (Borzouyeh) Petrochemical Company, one of Asalouyeh petrochemical companies. In this section, initially, Nouri Petrochemical Company introduced and then the implementation of the proposed model and its results will be studied.

Nouri Petrochemical Company

Nouri Petrochemical Company (Borzouyeh) is one of the largest manufacturers of aromatic in the world with a capacity of 5.4 million tons per year, including strategic planning Third Five Year Plan (2001-2004) National Petrochemical Company of Iran, which formally opened in July 2007 and is now operating.

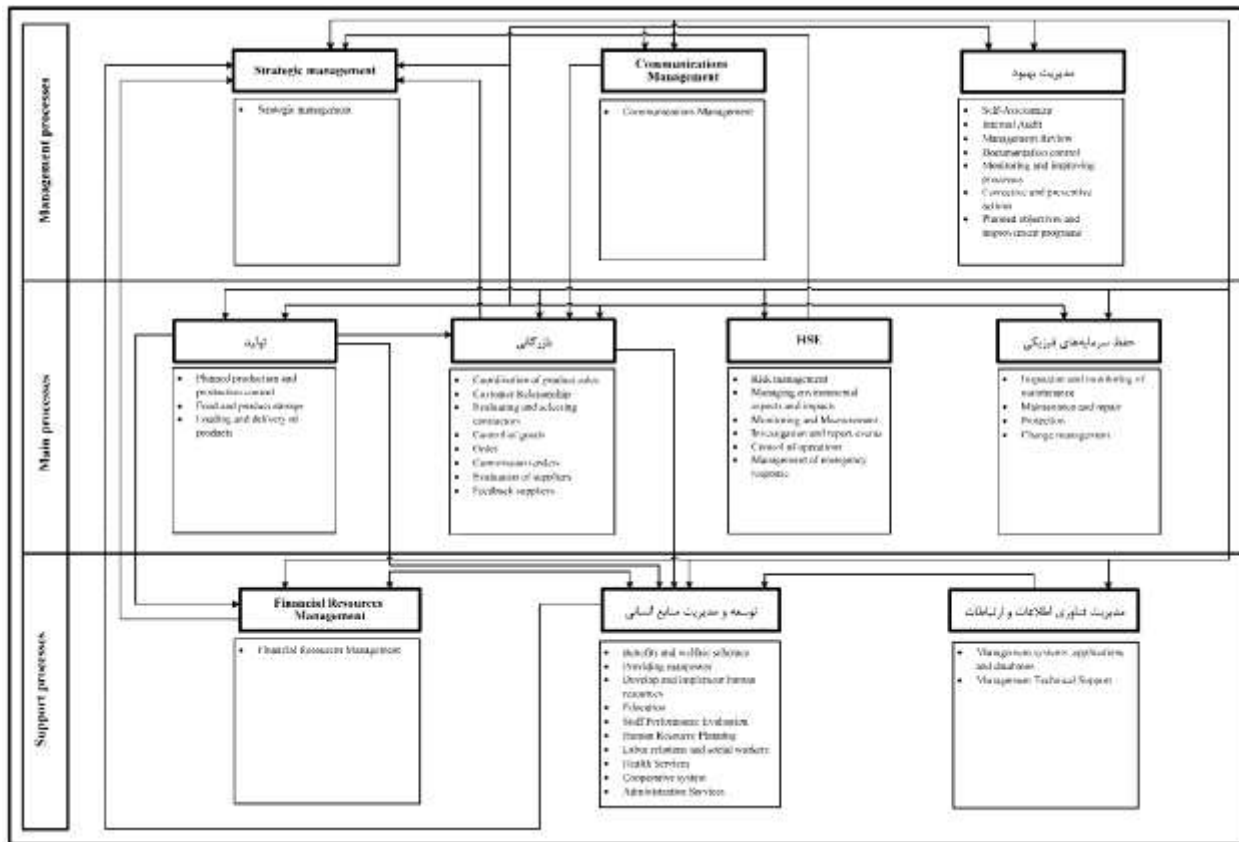
Easy access to food, fuel and ancillary services, use of new road and sea transport network, using the rules of free trade zones, existence Persian Gulf International Airport and most importantly, the creation of added value in the use of gas condensate of the most important features that the company has benefited from it. The company started operations in December 1998 and the first unit was launched early in the second half of 2006.

In the Nouri Petrochemical Company, from 2007 and along with the standard of ISO 9001, according to the requirements of this standard and to ensure the ability of the organization to tasks assigned to units 14 and the identification process were developed. In 2009, according to the results of the self-assessment, BPI approach discussed to identify all the Business Process Excellence Council the organization and the allocation of resources and the formation of working group processes, administrative proceedings started. Committee to study processes and process models, eventually inspired by the model of the PFC that is APQC, business processes Nouri Petrochemical Company (Borzouyeh) were developed.

According to this approach, , Nouri petrochemical were considered as a system with three levels of macro processes, including basic processes, support processes and management processes.

In the next stage as shown in Figure 4 the following processes (processes of zero and one), each of the three main groups, support and management were identified and birth were developed for each process.

Figure 4. Map process Nouri Petrochemical Company.



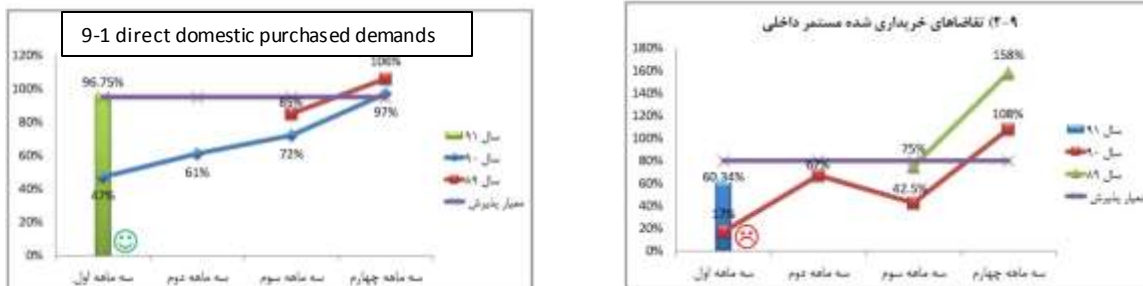
Calculated Points based on the model proposed

As noted earlier, based on the three parameters of acceptable range, an improvement compared to the previous period and allocation process of continuous improvement and the scores given to each raw score of each index are calculated.

Following the calculation of indices is shown for example as process of controlled goods.

Process: Control Products

Table 13. Control products Process.



9-2 internal continuous purchased demands

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Name of index	Being in accepted region		Improvement compared last period		Continuous improvement		Row score of index
	Difference percent	Score	Percent of improvement	Score	Number of continuous improvement	Score	
Directly purchased domestic demand	In accepted region	5	Not improved	0	2	1.3	6.3
Continuous purchased domestic demand	%24.57	2.25	Not improved	0	0	0	2.08

Index Title: Directly purchased domestic demand

Acceptance criteria Index 95%

Index performance during this period: 96.75%

Index performance in the previous period: 97%

The first parameter: Being in the range of acceptance

Due to compare the determined acceptance criteria and performance indicators, suggest that the measurement range is accepted, so full marks in this section is given to Index.

$R = 5$

The second parameter: improved compared to the previous period

Comparing the performance of the index during this period with the previous period shows that the index has declined compared to the previous period; therefore index does not score in this section.

$I = 0$

The third parameter: the process of continuous improvement

Looking at the chart drawn, comparing data from four monitoring and measuring, the process of continuous improvement can be observed that in this case the score is 1.3 indicators in this section.

$C = 1.3$

By adding the scores index domestic demand directly purchased in the three sectors, the number is 6.3 which represents a raw score of this index.

$$PR_{Ij} = R_j + I_j + C_j$$

$$PR_{I1} = 5 + 0 + 1.3 = 6.3$$

The final score of the index multiplied by in the ratio index the raw scores obtained.

$$FR_{Ij} = W_{Ij} \times PR_{Ij}$$

$$FR_{I1} = 0.70 \times 6.3 = 4.41$$

Index Title: Continuous purchased internal demands

Acceptance criteria index: 80%

Index performance during this period: 60.34%

Index performance in the previous period: 108%

The first parameter: Being in the range of acceptance

Due to compare the determined acceptance criteria and performance indicators, concluded that the measurement range is not accepted; however, the percentage difference between the performance of the index with the specified acceptance criteria and index this section is part of the score.

80%

|

60.34%

$$S = \frac{100 \times 60.34}{80} = 75.42$$

$$X = |100 - S| = 24.57$$

After calculating the X value using the Table 1, section 4-1-5-1, gain it's R-value.

$$R = 2.08$$

The second parameter: improved compared to the previous period

Comparing the performance of index during this period with the previous period shows that the index has declined compared to the previous period; therefore index does not score in this section.

$$I = 0$$

The third parameter: the process of continuous improvement

Looking at the chart drawn, comparing data from four monitoring and measuring the process of continuous improvement in this index were observed, so this part is an index score will not be considered.

$$C = 0$$

By adding the scores index internal demands directly purchased in these three sectors, the number is 2.08 which represents a raw score of this index.

$$PR_{I2} = 2.08 + 0 + 0 = 2.08$$

Like the previous index multiplied by the coefficient determined for index, the index is the final score.

$$FR_{I2} = 0.30 \times 2.08 = 0.624$$

After calculating the raw scores for each index and applying the factors taken into account and obtain the final score indicators should specify scores processes.

The final scores were collected indicators of a process indicates the raw scores process. In the above example, the process of technical support in the index, is calculated in this way.

$$PR_{Pz} = \sum_{j=1}^n FR_{Ij}$$

$$PR_{P1} = FR_{I1} + FR_{I2} = 4.165 + 0.10855 = 4.27355$$

Also final score of the process of multiplying the absolute level of crude scores process, can be obtained.

$$FR_{P1} = W_{P1} \times PR_{P1}$$

$$FR_{P1} = 0.0052 \times 4.27355 = 0.02222246$$

In the table 14 raw scores and final petrochemical business processes Nouri is shown.

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Table 14. Calculation of the final scores of business processes.

The process name	Raw rating process	The absolute coefficient	The final rating process
Planned production and production control	4.80306	0.0622	0.298750332
Food and product storage	0	0.0089	0
Loading and delivery of products	7.75353	0.0089	0.069006417
Coordination of product sales	7.475	0.0584	0.43654
Customer Relationship	8.1051	0.0050	0.0405255
Evaluating and selecting contractors	3.89	0.0215	0.083635
Control of goods	6.346396	0.0163	0.103446255
Order	5.34602	0.0256	0.136858112
Commission tenders	2.56382	0.0125	0.03204775
Evaluation of suppliers	5	0.0046	0.023
Feedback suppliers	6.022	0.0037	0.0222814
Risk management	2.5	0.0063	0.01575
Managing environmental aspects and impacts	5	0.0071	0.0355
Monitoring and Measurement	5.999026	0.0026	0.015574676
Investigation and report events	0	0.0013	0
Control of operations	1.47	0.0038	0.005586
Management of emergency response	0	0.0017	0
Inspection and monitoring of maintenance	4	0.0088	0.039534352
Maintenance and repair	7.37073	0.0116	0.085500468
Protection	9.2083	0.0019	0.01749557
Change management	5	0.0107	0.0535
Strategic management	0	0.3878	0
Self-Assessment	0	0.0142	0
Internal Audit	3.475	0.0481	0.1671475
Management Review	8.65	0.0221	0.191165
Documentation control	7.5	0.0064	0.048
Monitoring and improving processes	8.65	0.0367	0.317455
Corrective and preventive actions	1.585	0.0310	0.049135
Planned objectives and improvement programs	1.362	0.0689	0.0938418
Communications Management	5.9	0.0354	0.20886
Financial Resources Management	7.064955	0.0373	0.263522822
Benefits and welfare schemes	0.74	0.0007	0.000518
Providing manpower	7.15	0.0011	0.007865
Develop and implement human resources	4.45555	0.0059	0.026287745
Education	6.59	0.0028	0.018452
Staff Performance Evaluation	5.9	0.0006	0.00354
Human Resource Planning	7.32736	0.0012	0.008792832
Labor relations and social workers	4.32361	0.0004	0.00172944
Health Services	3.8881	0.0009	0.00349929
Cooperative system	7.88045	0.0034	0.02679353
Administrative Services	8.07333	0.0008	0.006458664
Management systems, applications and databases	2.85675	0.0061	0.017426175
Management Technical Support	4.27355	0.0052	0.02222246

At the last stage with regard to the final score of processes, the final score of (10) is achieved using performance evaluation model based on business processes.

$$FR_O = \sum_{z=1}^n FR_{Pz}$$

Results of implementation the model in Nouri Petrochemical Company (Borzouyeh)

With regard to the implementation of the model in Nouri Petrochemical Company (Borzouyeh), the results of the analysis of the results, as presented:

- Identify criteria for prioritization of business processes according to the experts
- Prioritization to business processes and identify 17 key process (Table 15) according to increased profitability and increased productivity

Table 15. Score gained by assessing the percentage of level A of processes.

The process name	Macro process	Priority of overall process	Priority of zero process	Priority of 1 st process	overall Priority of process
Strategic management	Management processes	0.6505	0.5961	1.0000	0.3878
Planned objectives and improvement programs	Management processes	0.6505	0.3495	0.3030	0.0689
Planned production and production control	The main processes	0.2834	0.2823	0.7778	0.0622
Coordination of product sales	The main processes	0.2834	0.5208	0.3957	0.0584
Internal Audit	Management processes	0.6505	0.3495	0.2115	0.0481
Financial Resources Management	Support processes	0.0663	0.5623	1.0000	0.0373
Monitoring and improving processes	Management processes	0.6505	0.3495	0.1613	0.0367
Communications Manager	Management processes	0.6505	0.0544	1.0000	0.0354
Corrective and preventive actions	Management processes	0.6505	0.3495	0.1364	0.0310
Order	The main processes	0.2834	0.5208	0.1375	0.0256
Management Review	Management processes	0.6505	0.3495	0.0972	0.0221
Evaluating and selecting contractors	The main processes	0.2834	0.5208	0.1458	0.0215
Control of goods	The main processes	0.2834	0.5208	0.1103	0.0163
Self-Assessment	Management processes	0.6505	0.3495	0.0624	0.0142
Commission tenders	The main processes	0.2834	0.5208	0.0884	0.0125
Maintenance and repair	The main processes	0.2834	0.1165	0.3504	0.0116
Change management	The main processes	0.2834	0.1165	0.3237	0.0107

- Evaluation of company performance based on data from process monitoring and measurement processes, between 2010 until 2013 and earned 300 Score from 1,000 points Nouri Petrochemical Company (Borzouyeh) obtained 470 score in the performance evaluation model based on the European Foundation for Quality Management (EFQM) in the period. Also based on the balanced scorecard (BSC), performance of Nouri Petrochemical Company (Borzouyeh) based on the years 2009 till 2014 was 140.8%.

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Table 16. Comparison of the performance evaluation Score in Nouri Petrochemical Company based on three models.

Performance evaluation model	Maximum score	Evaluation score	Main focus
Model-based business processes	1000	(%30) 300	Process-Oriented
Business Excellence Model of the European Foundation for Quality Management (EFQM)	1000	(%47) 470	Beneficiary-Oriented
Evaluation Model balanced scorecard (BSC)	%100	%140.8	strategy-Oriented

Discussion on the research results

The first notable point in this discussion is the importance of priority business processes. The experts were questioned, the importance of each of the ten priority measures are different. Criterion "increased profitability" 6.83 priority more important measure and "cost savings" with 4.07 priority is the least important. Also the paired comparisons done, different levels of importance and priority processes (macro, zero and one) and indicators for monitoring and measurement is also different.

Among macro-level processes, management processes group 0.6505 weighing gained highest priority and support processes group weighing 0.0663 had the lowest priority. Also among the three macro-level processes, strategic management process in 0.5961 weighing between management processes, business process weighing 0.5208 between core processes and process management in the financial resources in 0.5623 weighing between support processes had highest priority. Should be noted in this regard the acquisition of at least 50% of the total priority of each of the three macro-level processes done by these three process.

On the other hand, weighing 0.0544 management process communication between processes in the process of HSE 0.0804 priority between core processes and process management in ICT 0.1697 priority between groups support processes have gained the lowest priority.

Another significant point is achieving an accurate and realistic assessment of the organization's performance using this model. As shown in Figure 5 is; in this model, evaluation of the lowest levels associated with the beginning of the performance and the level of macro processes and will continue to evaluate the performance of the organization.

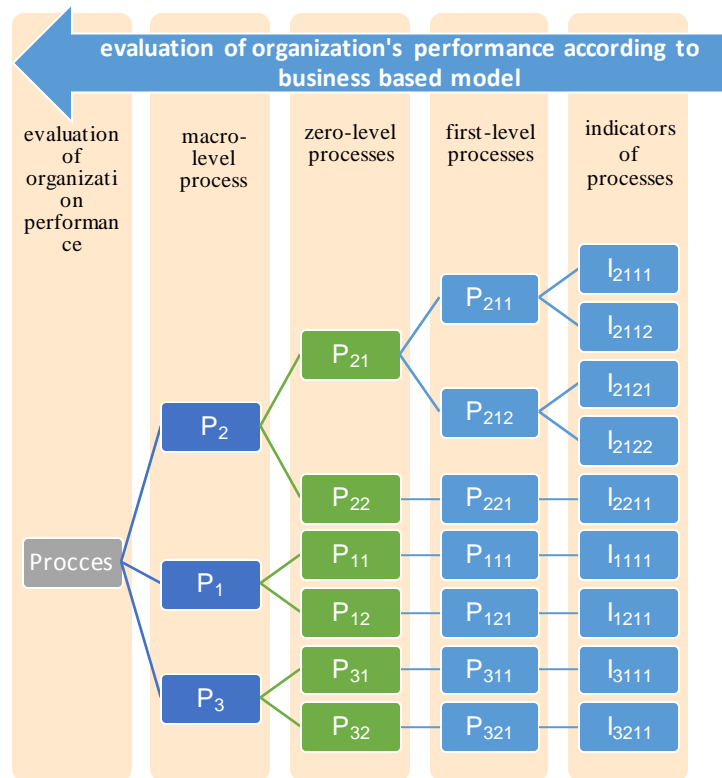


Figure 5. The levels of performance evaluation model based on business processes.

In the indicators of monitoring and measuring processes, because all aspects are involved in a process index efficiency and effectiveness criteria are evaluated; therefore can be make sure that an accurate assessment of the organization performance is done. Evaluate the effectiveness of measures designed to achieve the objectives, and indicators of job performance evaluation of the correct use and optimization of resources, including the following, are responsible:

- Human Resources
- Financial Resources
- Equipment
- Machinery
- Infrastructure, buildings and workspaces
- Rules and Regulations
- Executive methods and agendas

Also, since the implementation of the strategy is done through business processes; therefore, the performance evaluation process based on this model can be developed to identify strategies realization or non-realization.

CONCLUSION

Present study in the sense that the performance assessment and provided a model for evaluating the performance of companies in the manufacturing, service, health and deals; with other similar studies, but in terms of the management contract process for evaluating the performance of the organization and implementation of the model in light Petrochemical Company (Borzouyeh) are different with other studies. According to the research findings and experiences that have experience in the company; the model should be able to evaluate the performance of the organization first and provide clear view of the main objectives and to achieve macro- strategies. Accordingly, the proposed model, basing the business processes of the foundation, the cornerstone of the organization; try to provide a comprehensive model for the assessment

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of performance. Present study has tried to review the literature, a comprehensive model for realistic assessment of the performance of the organization. However, there seems to expand the study. So, for future studies, proposals "Implementation of the proposed model in service organizations, medical and nonprofit" and also "identify new variables for scoring the indicators" are presented.

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