Identification and Prioritization of Effective Intra-project and Environmental Challenges on Project Management System (Case Study: Projects of Pars Special Economic Energy zone)

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Abstract

What gives meaning and life is dominant management on projects. Project management base is systematic control of time variables, cost, quality and quantity in all project phases, and achieving optimum combination of components. Existed executive environmental and structural challenges exploration is so important in project management. In order to explore and analyze, environmental and structural factors effective on projects should be identified. Therefore, to do this fact, correlation among strategic factors have been explored and determined by FUZZY TOPSIS in order to offer the most important effective factor on area projects against existed executive environmental and structural management. Therefore, this research works on identifying and prioritizing environmental and intra-project challenges effective on project management system execution in projects of Pars Special Economic Energy zone.

Based on environmental and intra-project challenges important conception which is effective on project management system in economic special area in this research, after identifying intra-project and environmental challenges by surveying in Pars Special Economic Energy zone and distributing questionnaire among statistical society members, environmental and intra-project challenges effective on project management system execution with TOPSIS technical have been classified.

This research results have shown that far intra-project, near environmental, intra-strategic, and intra-operational challenges have from the most to the least importance and priority, respectively.

Keywords: intra-project challenges, environmental challenges, project management, Pars Special Economic Energy zone (PSEEZ)

Introduction

If a project doesn’t have organization support, it will certainly face with failure. In this case, project manager was stuck in dilemma whether he continues his work or accepts existed conditions or cedes his work. Whether he should be loyal to project and stayed with it to the last moment or cedes its continuing to keep his work condition.

Because unfavorable results of projects put unfavorable effects on project management status even this result has been obtained by his external factor involvement. There should always be close relationship among general plans, firm development, and development derived from a project execution. Project purposes should be in alignment and association with massive plans and purposes of firm. Therefore, firm should prioritize project activities adequately. Unfortunately most works have been done don’t have alignment and association with firm’s plans (Eric S. Anderson, et al. 2003, 19).

The purpose of offering scheduled for project is providing “road map” which can say how and when the project can present achievement with the same defined limitation. Time scheduling tool include components, scheduling rules to relate components and using components to offer process to complete project. This matter is seeable simply with executing time scheduling before adding any other activity or project’s other criterion data by observing various components of that tool in order to make scheduling model in access.

Project management base is time variables systematic control, cost, quality and quantity in project all phases and achieving the optimum combination from these component. Project manager should investigate the relationships among project phase various activities by significant experts working in a system framework, and adjust comprehensive plan by considering all existed limitations, technical, economic, human, political, environmental and the other related factors necessities in order to execute project. Project performance is dependent on executing organizations performance of that project. It is clear that these organizations maturity
level in dependent on various environmental and internal factors. Defects in each of factors can make disturbance in project performance and cause problem in their purposes establishments. It is necessary to improve project performance that all factors are getting explored, and harms and potential problems are getting identified and improved. Environmental factors are including projects execution system, rules and regulations, supporting knowledge, environmental information and awareness, economic, social, cultural, and safety conditions.

Some internal factors can be considered as human resources, business processes and organization financial resources. Supporting knowledge is as one the fundamental infrastructures of development and environmental effective factors on organizations performance, and wisdom-oriented infrastructure. Project performance is dependent on executive organizations performance of that project. It is clear that these organizations maturity level is based on various internal and environmental factors. The defect in each of these factors can disturb project performance, and its purposes accomplishment faces with problem. In order to have project performance, it is necessary all factors to be explored, and potential harms and problems to be identified and improved. Environmental factors are including project execution system, rules and regulations, supporting knowledge and environmental awareness, economic, social, cultural, and safety conditions. In organizational environment changing conditions and technological fast changes, organizational execution activities should be faster. Therefore, existed execution environment and structural challenges exploring is so important. In order to analyze these problems, effective environmental and structural factors on projects should be identified.

Therefore, to do this fact, the correlation among strategic factors are explored and determined by FUZZY TOPSIS process in order to offer the most important effective strategy on area projects management against existed executive environmental and structural challenges.

Literature

Project environment

Today, there is a growing awareness and concern for the impact of infrastructure and facility construction on the physical environment. Fortunately, today's technological disciplines responsible for such work are becoming attuned to the idea of mitigating the adverse impacts of their projects. Certainly the project manager needs to be similarly concerned about the project's technology, and manage accordingly. This applies to both the implementation and shorter term practical construction impacts of the project as well as its conceptual development and consequent long term impacts. However, today's project manager also needs to be attuned to the cultural, organizational and social environments of the project. Understanding this environment includes identifying the project stakeholders and their ability to affect its successful outcome. This means working with people to achieve the best results, especially in the highly technical and complex environments such as those involving modern day construction projects. Therefore, it is essential that the project manager and his or her project team are comfortable with, and sympathetic towards, their cultural, organizational and social surroundings. This leads to the possibility of influencing the project environment in a positive way, for the better reception of the change which the project is designed to introduce. For example, peoples' typical resistance to change will no doubt be evident amongst some of the stakeholders. Others may have vested interests or personal or group agendas which are only indirectly related to the project. If these can be identified in good time, they may be dealt with proactively and in such a way that the corresponding risks, which are otherwise likely to undermine the success of the project, can be significantly reduced. Failure to take such an approach will inevitably lead to a less than optimum project outcome (Wideman & Canada, 2001.).

The Project's Surroundings

On some projects, events external to the project sometimes come as a surprise to the project manager and his team and are therefore seen as obstacles to progress. However, as noted earlier, projects generally exist only because of that external environment and so it is essential for the project team to recognize that they must also be responsive to it. It includes the established and latest state-of-the-art technology in which the project is based, its customers and competitors, its geographical, climatic, social, economic and political settings, in fact, virtually everything that can impact its success. These factors can affect the planning, organizing, staffing and directing which constitute the project manager's main responsibilities. This external environment represents a
complex set of inter-dependent relationships, which constantly react with the project as it is brought into reality. Conversely, most projects are intended to impact the environment in one way or another, and this is particularly true of infrastructure projects. Therefore, for the project to be ultimately successful, these inter-dependencies must be taken into account. Even more important, the factors noted above have a habit of changing during the life of the project, especially if the project takes a number of years to complete, and is brought on-stream in phases. This translates into a high degree of uncertainty or risk surrounding the project, as a result of its external environment. In fact, the greater the degree of interdependence, the greater the degree of uncertainty, and the greater the challenge for the project manager and his team (Wideman & Canada, 2001.).

The project manager should consider project in its cultural social international, political and physical environmental context. Understanding this environment also involves, identifying the project stakeholders and their ability to affect its successful outcome. And this leads to the possibility of influencing this environment in a positive way, for the better reception of the change which the project is designed to introduce. Also project manager must work with people to achieve the best results, especially in the highly technical and complex environments such as those involving modern day construction projects (Wideman, 1990). Cultural and social environment, the team needs to understand how the project affects people and how people affect the project. This may require an understanding of aspects of the economic, demographic, educational, ethical, ethnic, religious, and other characteristics of the people whom the project affects or who may have an interest in the project. The project manager should also examine the organizational culture and determine whether project management is recognized as valid role with accountability and authority for managing the project (Gido and Clement, 2008). Also under cultural and social environment communication is very important part for the project success. Many project managers and team members do not provide enough information to enough people, along with the lack of an infrastructure or culture for good communication, soothe deficit of the communication make the stakeholders to lose hope in effective participation on project implementation. In order to have a clear internal and external environment for effective implementation of the project, proper communication flows for project members and develop checklist of what information like reports needs to be conveyed to project participants. For example there have been the project in Dodoma dealing with rain water harvesting in which after the completion of the project, the villagers continued in using water collected in natural depressions or man-made reservoirs but have shown very little interest in adopting the technology. Also the observation were made from the fact and showed that, although the benefits of the technology have been very well demonstrated in Dodoma, very few individuals’ or villages has adopted the construction of their own reservoirs (Hatibu and Mahoo 1999).

Methodology

Based on the four perspectives of theorists, the expansion or improvement of existing theories, a comparison of different theoretical perspectives to examine a particular phenomenon using different theoretical perspectives and the study documented a phenomenon repeated in the new environment (Feldman, 2004), the present study placed fourth.

In this paper, the Analytical Hierarchy Process and Expert Choice software will be used to test hypotheses. Implementation steps of this research are:

1. Library Studies (literature review),
2. mining structures and variables associated with the choice of supplier,
3. designed measuring tools,
4. A preliminary field studies,
5. Adapted and modified instrument,
6. Field data collection,
7. Data analysis and hypothesis testing,
8. Conclusions and recommendations are presented.

Since the study is a survey, as many research studies to collect primary data, a questionnaire was used to test the hypotheses. For use in connection with the assumption of experts and interviews with them to design a questionnaire containing 54 questions to consider are as follows in Table 1:
Table 1: questionnaire

<table>
<thead>
<tr>
<th>Subject</th>
<th>The questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact of Internal Factors on Project Cost Management</td>
<td>1 to 16</td>
</tr>
<tr>
<td>Impact of Internal Factors on Time Management</td>
<td>17 to 33</td>
</tr>
<tr>
<td>The impact of internal factors on the quality of project management</td>
<td>34 to 38</td>
</tr>
<tr>
<td>Impact of environmental factors on Project Cost Management</td>
<td>39 to 46</td>
</tr>
<tr>
<td>Impact of environmental factors on Time Management</td>
<td>47 to 50</td>
</tr>
<tr>
<td>Impact of environmental factors on the quality of project management</td>
<td>51 to 54</td>
</tr>
</tbody>
</table>

Analyzing the Data

In this stage, using the techniques of AHP, the weights of criteria and indicators are calculated after determining the coefficients of the variables were ranked using AHP assessment of the current study is shown in the following table:

Table 2: Criteria for evaluating research

<table>
<thead>
<tr>
<th>Name</th>
<th>Criteria</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>Operating environment</td>
<td>Project Cost Management</td>
</tr>
<tr>
<td>Q2</td>
<td></td>
<td>Project Quality Management</td>
</tr>
<tr>
<td>Q3</td>
<td></td>
<td>Time Management</td>
</tr>
<tr>
<td>Q4</td>
<td>Environmental factors closely</td>
<td>Project Cost Management</td>
</tr>
<tr>
<td>Q5</td>
<td></td>
<td>Project Quality Management</td>
</tr>
<tr>
<td>Q6</td>
<td>Managing interoperability</td>
<td>Time Management</td>
</tr>
<tr>
<td>Q7</td>
<td></td>
<td>Project Cost Management</td>
</tr>
<tr>
<td>Q8</td>
<td></td>
<td>Project Quality Management</td>
</tr>
<tr>
<td>Q9</td>
<td></td>
<td>Time Management</td>
</tr>
<tr>
<td>Q10</td>
<td>Strategic internal factors</td>
<td>Project Cost Management</td>
</tr>
<tr>
<td>Q11</td>
<td></td>
<td>Project Quality Management</td>
</tr>
<tr>
<td>Q12</td>
<td></td>
<td>Time Management</td>
</tr>
</tbody>
</table>

Measurement criteria

Table (4-3) criteria affecting the paired comparisons matrix to identify and prioritize the projects and environmental challenges affecting the implementation of the project management system of data collection in the table of the geometric mean has been given.

<table>
<thead>
<tr>
<th>Factors influencing the identification and prioritization of projects and environmental challenges affecting the implementation of project management</th>
<th>Operating environment</th>
<th>Environmental factors closely</th>
<th>Managing interoperability</th>
<th>Strategic internal factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating environment</td>
<td>1</td>
<td>3.318</td>
<td>2.292</td>
<td>1.306</td>
</tr>
<tr>
<td>Environmental factors closely</td>
<td>0.301</td>
<td>1</td>
<td>2.056</td>
<td>1.174</td>
</tr>
<tr>
<td>Managing interoperability</td>
<td>0.436</td>
<td>0.486</td>
<td>1</td>
<td>0.939</td>
</tr>
<tr>
<td>Strategic internal factors</td>
<td>0.766</td>
<td>0.851</td>
<td>1.065</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3: compared to paired criteria from target identification and prioritization of factors affecting the project and environmental challenges affecting the implementation of project management software
Table 21) matrix Normal by Levels Priority than the Effective measures to identify and prioritize environmental challenges affecting the implementation of the project and project management.

Based on the above matrix, we found that:

1. Criteria to measure the circumference of 3.318 is close to environmental factors.
2. Important criterion to measure the circumference of interoperability is 2.292.
3. Important criterion to measure the circumference 1.306 strategic internal factors.
4. Important environmental factor close to 2.056 times the standard measure of intrinsic factor is operational.
5. Important environmental factor close to 1.191 times the standard measure of strategic internal factors.
6. 1.065 times the standard criteria of strategic internal factors, internal factors are operating.

Table 4: Calculate Rate (WSV) Matrix Comparison the Options than the Criteria Effective the Identification and Priority Category Challenge Of Within Project of AndEnvironmental Effective the Run System Management Project.
Table 5: Calculate Rate CV matrix Comparison the Options than the Factors Effective the Identification and Priority Category Challenge of within Project of and Environmental Effective The Run System Management Project

- Calculation Amount max:
- Calculation Index Compatible with (CI):
- Calculation Rate Compatible with (CR):

RI Show The Amount Index Random Is The Table (4-11) Extraction By It is. Replica of L the Rate Compatible with Smaller of 0.1 Was Is Therefore Comparison of the South Couple of criteria affecting the identification and prioritization of projects and environmental challenges affecting the implementation of the project management system stability More It is.

Weights of the criteria and environmental factors, the environmental factors, internal factors, operational, strategic internal factors are as follows:
- Operating environment: 0.409
- The environmental factor: 0.221
- Operational internal factors: 0.157
- Strategic internal factors: 0.212

So far the highest standards of environmental factors have to be weighed.

Prioritize index using TOPSIS method

<table>
<thead>
<tr>
<th>Factors influencing the identification and prioritization of projects and environmental challenges affecting the implementation of project management</th>
<th>ANW</th>
<th>Priorities</th>
<th>( \text{AV} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.779</td>
<td>0.409</td>
<td>4.349</td>
</tr>
<tr>
<td>2</td>
<td>0.916</td>
<td>0.221</td>
<td>4.145</td>
</tr>
<tr>
<td>3</td>
<td>0.641</td>
<td>0.157</td>
<td>4.083</td>
</tr>
<tr>
<td>4</td>
<td>0.88</td>
<td>0.212</td>
<td>4.151</td>
</tr>
</tbody>
</table>

**Table 5**: Calculate Rate CV matrix Comparison the Options than the Factors Effective the Identification and Priority Category Challenge of within Project of and Environmental Effective The Run System Management Project

**Calculation Amount max:**
**Calculation Index Compatible with (CI):**
**Calculation Rate Compatible with (CR):**

RI Show The Amount Index Random Is The Table (4-11) Extraction By It is. Replica of L the Rate Compatible with Smaller of 0.1 Was Is Therefore Comparison of the South Couple of criteria affecting the identification and prioritization of projects and environmental challenges affecting the implementation of the project management system stability More It is.

Weights of the criteria and environmental factors, the environmental factors, internal factors, operational, strategic internal factors are as follows:
- Operating environment: 0.409
- The environmental factor: 0.221
- Operational internal factors: 0.157
- Strategic internal factors: 0.212

So far the highest standards of environmental factors have to be weighed.
Second Harmonic Scale gain matrix to achieve the matrix, the matrix B Scales (N) the diagonal matrix of weights \(W_{nxn}\) multiplied by the weight. Method obtains ENTROPY.

Because of the weight matrix in the survey are listed below:

\[
\begin{array}{cccc}
0.194 & 0.075 & 0.075 & 0.05631 \\
0.214 & 0.125 & 0.088 & 0.1351 \\
0.252 & 0.109 & 0.081 & 0.09908 \\
0.142 & 0.125 & 0.069 & 0.11707 \\
\end{array}
\]

Step Three: Determine the positive ideal solution and negative ideal solution

+\( A = \) \[
\begin{array}{cccc}
0.252 & 0.125 & 0.088 & 0.1351 \\
\end{array}
\]

-\( A = \) \[
\begin{array}{cccc}
0.142 & 0.075 & 0.069 & 0.05631 \\
\end{array}
\]

Stage IV has the option to acquire the distance between the positive and negative ideal

\[
D_i^+ = i = 1, 2, \ldots, m
\]

\[
D_i^- = i = 1, 2, \ldots, m
\]

\[
\begin{array}{c}
d_1^+ = 0.111 \\
d_2^+ = 0.039 \\
d_3^+ = 0.04 \\
d_4^+ = 0.113
\end{array}
\]

\[
\begin{array}{c}
d_1^- = 0.05216 \\
d_2^- = 0.11894 \\
d_3^- = 0.12332 \\
d_4^- = 0.07877
\end{array}
\]

Step Five: Determine the relative proximity (CL) is an option ideal solution

\[
CL_i = d_i^- / d_i^+ + d_i^+ 
\]

\[
\begin{array}{c|c}
cl_i & \\
cl1 & 0.32 \\
cl2 & 0.754 \\
cl3 & 0.754 \\
cl4 & 0.411
\end{array}
\]

Step VI: Ranking the options

The option with the highest cl has had the best performance.

<table>
<thead>
<tr>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 3</td>
</tr>
<tr>
<td>Option 2</td>
</tr>
<tr>
<td>Option 4</td>
</tr>
<tr>
<td>Option 1</td>
</tr>
</tbody>
</table>

Table 5: Prioritize Options

Conclusion

According to present research findings, effective environmental and intra-project challenges identification and prioritization have been measured on project management execution in Pars Special Economic Energy zone. Achieved results from gathered data according to analyses done on gathered questionnaires using Spss shows that research hypotheses are confirmed and final respond is also acceptable which in the following sections there are explanations about these hypotheses confirmations or rejections:
1. This research first hypothesis indicates that internal factors are effective on projects costs management is observed with 95% probability in model. Each sample T test’s significance equals 0.00 that is less than 0.05; therefore, research first hypothesis is accepted.

2. This research second hypothesis indicates that internal factors are effective on time management of projects that this hypothesis is seen in 95% probability in model. Each sample T test’s significance equals 0.00 that is less than 0.05; therefore, research second hypothesis is accepted.

3. This research third hypothesis indicates that internal factors are effective on time management of projects that this hypothesis is seen in 95% probability in model. Each sample T test’s significance equals 0.00 that is less than 0.05; therefore, research third hypothesis is accepted.

4. This research fourth hypothesis indicates that environmental factors are effective on cost management of projects that this hypothesis is seen in 95% probability in model. Each sample T test’s significance equals 0.00 that is less than 0.05; therefore, research fourth hypothesis is accepted.

5. This research fifth hypothesis indicates that environmental factors are effective on time management of projects that this hypothesis is seen in 95% probability in model. Each sample T test’s significance equals 0.00 that is less than 0.05; therefore, research fifth hypothesis is accepted.

6. This research sixth hypothesis indicates that environmental factors are effective on time management of projects that this hypothesis is seen in 95% probability in model. Each sample T test’s significance equals 0.00 that is less than 0.05; therefore, research sixth hypothesis is accepted.

In addition, in the second part of research using no.2 questionnaire about comparison paired variables for their prioritization, the following results are achieved:

1. Far environmental factor criterion importance, 3.318, equals near environmental factor criterion.
2. Far environmental factor criterion importance, 2.292, equals operational internal factor criterion.
3. Far environmental factor criterion importance, 1.306, equals strategic internal factor criterion.
4. Near environmental factor criterion importance, 2.056, equals operational internal factor criterion.
5. Near environmental factor criterion importance, 1.191, equals strategic internal factor criterion.
6. Near environmental factor criterion importance, 1.065, equals operational internal factor criterion.

Managerial-Applicable Suggestions

According to hypotheses rejection or confirmation in this research, it is suggested to special area policy makers and employees that:

1. Clarifying organizations’ projects expected outputs.
2. Making relationship between project beneficiary and to reduce double-working, and consequently, to reduce project time.
3. Making involved in project people familiar with Social Providing Insurance
4. Making a system to control organization projects costs corresponding to predicted plans
5. Up-estimating needed resources and capacities to do project projects
6. Supporting adequately from projects continually and permanently by organization superior management
7. Reducing administrative bureaucracy
8. Making people loyally involved in project temporary structures
9. Making motivations for involved people in organizational projects by senior managers
10. Giving promoting chance to project planning and control unit in order to reduce projects time
11. Making project management office to control organization project time corresponding with predicted plans.
12. Aligning projects plans and purposes with organization plans.
13. Legislative, social, and economic obstacles in executing organization projects to be identify and solve as much as possible
14. Technologic, value, cultural, and environmental obstacles in executing organization projects are also identified and solved.
15. Lost times or project environmental real conditions should be considered in project calendar.

References

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WEBSITES http://www.e-projectcoach.com/understanding_the_project_environment.htm