Modeling On Performance Drivers Of Project Management

1Shahryar Sorooshian and 2Javad Dodangeh
1Faculty of Technology, University Malaysia Pahang, Malaysia
2Department of industrial engineering, Qazvin branch, IAU, Qazvin, Iran.

ARTICLE INFO

Article history:
Received 1 September 2013
Received in revised form 25 November 2013
Accepted 29 November 2013
Available online 4 January 2014

Key words:
Project implementation, Project management, performance, DEMATEL

ABSTRACT

Background: Project implementation form part of the functional project management process. Objective: the main objectives of this research are to examine the structural relationship between project management and performance in small and medium manufacturing firms. Results: Implementation of an effective strategy requires the consideration of several organizational issues. According to literature, researchers have identified three major project implementation fundamental factors which include leadership style, structure and resources.

Conclusion: This research however, discussed the main drivers in project management that exist in small and industries. Empirical relationships are established regarding project management and performance.

INTRODUCTION

Studies have focused on project management mainly due to ineffective and inadequate business background between project formulation and implementation [1]. Project implementation is thought as a dynamic activity. The process of strategic management is responsible for changes with the structure and organizational management system. Hauc and Kova [2]; Cleland and Ireland [3] have investigated project implementation in project management. Wheelen et al. [4] have described implementation as a total activity and choice needed for strategic plan where policies and strategies are put in action. A well formulated project provide superior performance to projects if implementation effectively [5]. In the case of implementation of projects in influenced by top management as strategy makers. They also have authority in decision making which however, affects the entire organizational structure. For accurate strategy and management implementation the managerial skill is important. Jiang [6] and Sorooshian et al [7,8] have stated that strategies are directly linked to effective successful and efficient project management. Heraclous [1], however demonstrated that the project management failure costs enormously in the organization. The waste of time and money notwithstanding, project implementation failure results to employee low morale, lack of trust and faith in senior management. Moreover they lead to more flexible organization as failure of organization results to employee cynicism [1]. Emphasis is laid on effective project implementation by manager. In all the organizational factors structure, leadership and human recourses are pivotal in project implementation [9].

Leadership:

Kakabadse and Kakabadse [10] have stated that managers are important players in implementation and strategy formulation. Research recently has shown that the main role of executives was to ensure smooth procedure for the whole executive structure and also to communicate the structure successfully. Karami [9] however recommended investigation into research where top management team incorporate middle management in strategic formulation and or dissemination of strategic and objective through the management structure

Structure:

Organizational structure is a fundamental part of project management. Chandler [11] has stated that the fundamental determination of long term goals and enterprise objectives is strategy. Moreover, allocation of resources and course of action are essential through the organization that manages the enterprise. Apart from the fact that organizational developmental modification is in line with economic technological and demographic
changes, administrative problems and economic inefficiencies are created by new strategies. Structural changes are needed to address those issues by increasing performance [12].

Human resources:
Collins and Montgomery [13] have described resources based on project view as a set of assets and capacities including tangible and intangible which are competitively scarce, superior and appropriate, which have the potential to generate value from diversification. A resource which is known as competences includes a variety of assets which contributes to the competitive advantages of different businesses. Moreover, they are referred to as the building block criteria strategy which identifies what a project does and what it wants to do. They are firm’s production inputs in capital equipment, finance, employee skills patients and talent managers. The approach to project management sees human resource as a different source of firm’s competitive advantage [14, 15]. Lee et al. [16] have stated that there should be a relationship between a project’s strategy and its use of human resources. There is the believe that the management of people is essential in sustained competitive advantage. Recent studies have shown that human resources is a major factor in a firm’s performance identification [16, 17].

Performance:
The main constructs in strategic and organizational research is arguably financial performance construct. This is due to the fact that every model attempts to relate the construct of performance interest. There is the need to question the value of the course of action that does not impact on performance. Performance improvement is significant to research strategy [18-20].

Methodology And Survey:
The study objective was to evaluate the relationship between multi-dimensionality of project implementation drivers and performance by looking at the expert interview. In a research survey which was held in universities of Iran. Seven independent interviews were held to selected academician in management.

Decision Making Trial and Evaluation Laboratory (DEMATEL) is a sophisticated group decision making method for formulating and evaluating a structural model comprising the causal relationships among the complex and numerous factors [21]. During 1972 to 1976, this method was employed for the first time at Battelle Memorial Institute in Geneva to find out the complicated and interlaced problem group [22].

This methodology can verify interrelations between criteria and limit the relations which resonate the attributes of a system [23, 24]. DEMATEL method has been developed based on the opinion that suitable employ of scientific research methods could improve understanding of certain problems and determine solutions with executive capability by a hierarchical structure [21]. Using DEMATEL method for evaluating and processing individuals’ perceptions leads to individuals’ personal notions being involved in complex problems [22]. The final product of DEMATEL process is a visual demonstration – mind map – based on which the respondent manages his/her actions regarding the world [23] or adheres to the priorities stated in it [22].

DEMATEL method consists of few steps which are delineated as follows [24, 25].

Step 1: Creating the direct-relation matrix
Five scales are employed to measure the relationship between various criteria comprising:
0 = no influence
1 = low influence
2 = medium influence
3 = high influence
4 = very high influence

Then sets of the pair-wise comparisons in terms of effects and direction among criteria are provided by decision makers. Thereafter the initial data can be achieved as the direct-relation matrix which is a n × n matrix A where each element of aij is marked as the degree in which the criterion i impresses the criterion j.

Step 2: Normalizing the direct-relation matrix
Normalization is calculated applying the following equation. Note that each element $X_{ij}$ of matrix X is maximum one and minimum zero.

\[ K = \frac{1}{(\max_{1<i<n}\sum_{j=1}^{n}aij)} \]

Then sets of the pair-wise comparisons in terms of effects and direction among criteria are provided by decision makers. Thereafter the initial data can be achieved as the direct-relation matrix which is a n × n matrix A where each element of aij is marked as the degree in which the criterion i impresses the criterion j.

Step 2: Normalizing the direct-relation matrix

\[ X = K \times M \]

Step 3: Calculating the total-relation matrix

\[ X = K \times M \]
By applying the following formula 2, the total-relation matrix will be calculated. Note that I is the \( m \times m \) identity matrix.

\[
T = X(I - X)^{-1}
\]  

(2)

Step 4: Generating a causal diagram

Through Equation 3, the sum of rows and the sum of columns are separately marked as vector D and vector R. Afterwards, the horizontal axis vector (D+R) called “Prominence” is created by adding D to R, which presents the relative importance for every criterion. Likewise, the vertical axis (D-R) called “Relation” is generated by subtracting D from R, which may separate criteria into two groups including cause and effect. In general, the positive (D-R) means the criterion lies in the cause group and the negative (D-R) means the criterion reveals the effect group. Hence, the causal diagram is achievable by mapping the dataset of the (D+R, D-R), revealing some insight for facilitating decision makings.

\[
T = [t_{ij}]_{m \times m}, \quad i, j = 1, 2, ..., m \\
D = [\sum_{i=1}^{m} t_{ij}]_{m \times 1} = [t_{i.}]_{m \times 1} \\
R = [\sum_{i=1}^{m} t_{ij}]_{1 \times m} = [t_{.j}]_{1 \times m}
\]  

(3)

Result:

The nominal group technique (NGT) is a method for making decision for applying among different group sizes, in order to speed making decision, as by a vote, but everyone's opinions are considered and taken into account. There was an interview with experts of project management and performance measurement. It is vital to search out experts who will verify the relationships among the influential factors of performance success factors of project management. Experts asked to organize sets of pair-wise comparisons in terms of impacts and direction among performance success factors of project management elements. So the initial information can be achieved as the direct-relation matrix which could be a \( 4 \times 4 \) matrix A where every element of \( X_{ij} \) is marked as the degree within which the element i influences the element j. During this part we can notice the relation among significant factors in every criteria. Priorities of projects key success factors and their criteria are measured by DEMATEL technique. Casual diagram which incorporates horizontal maxis (D+R) and vertical axis (D-R) is ready. Relative importance of every feature is shown in horizontal axis that is referred to as “Prominence” similarity features are divided to cause and impact cluster in vertical axis that is referred to as “Relation”. Besides, advanced causal relationships aspects are visualized into observable structural model by casual diagram. However if (D-R) is negative, this facet lies in the impact group; alternatively if (D-R) is positive, the facet lies in the cause cluster. The relative importance of criteria is set by committee of professional decision makers. The relations among essential factors which are proposed in modeling of performance success of project management are illustrated in Figure 1.

![Fig. 1: The relationships in performance success of project management](image-url)
On the basis of step 2 and equation 1 normalized matrix of key success factors of projects management is depicted as follows (Table 1).

Table 1: Normalized performance success factors of project management

<table>
<thead>
<tr>
<th></th>
<th>Leadership</th>
<th>Structure</th>
<th>Human resources</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>0</td>
<td>0.2727</td>
<td>0.3636</td>
<td>0.3636</td>
</tr>
<tr>
<td>Structure</td>
<td>0.1818</td>
<td>0</td>
<td>0.1818</td>
<td>0.2727</td>
</tr>
<tr>
<td>Human resources</td>
<td>0.2727</td>
<td>0.1818</td>
<td>0</td>
<td>0.3636</td>
</tr>
<tr>
<td>Performance</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Then DEMATEL technique and total relationships strategic matrix are applied to performance success factors of project management; important factors for performance success of project management are demonstrated in Tables 2.

Table 2: Total relationships matrices for performance success of project management

<table>
<thead>
<tr>
<th></th>
<th>Leadership</th>
<th>Structure</th>
<th>Human resources</th>
<th>Performance</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>0.2199</td>
<td>0.4275</td>
<td>0.5213</td>
<td>0.7498</td>
<td>1.9185</td>
</tr>
<tr>
<td>Structure</td>
<td>0.2919</td>
<td>0.1365</td>
<td>0.3128</td>
<td>0.5299</td>
<td>1.2711</td>
</tr>
<tr>
<td>Human resources</td>
<td>0.3858</td>
<td>0.3232</td>
<td>0.1991</td>
<td>0.6645</td>
<td>1.5726</td>
</tr>
<tr>
<td>Performance</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>D</td>
<td>0.8976</td>
<td>0.8872</td>
<td>1.0332</td>
<td>1.9442</td>
<td></td>
</tr>
<tr>
<td>D+R</td>
<td>2.8161</td>
<td>2.1583</td>
<td>2.6058</td>
<td>1.9442</td>
<td></td>
</tr>
<tr>
<td>D-R</td>
<td>-1.0209</td>
<td>-0.3839</td>
<td>-0.5394</td>
<td>1.9442</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 2: Casual relationships for performance success of project management

Discussion:

Management style arguably influences considerably on the project implementation. It is worthy of note that successful realization of project is known by the coherence decisions and actions of employee resources at all organizational level and not by people who initiated the strategy. This study developed a model to show direct and indirect relationship between performance and project management factors. There is the need to direct all employee and other resources to same project implementation to ensure realization of project at all levels.

The findings supported the research hypothesis which however, showed that strategy implementation plays significant roles in a financial performance. This research was limited to sample exploration of experts in Iran where respondents are limited to university lecturers; factor in one theoretical limitation in this study. Organizational forces e.g managers’ culture influenced human resource practices. This study also showed that the findings cannot be generalized even though the principles may be applicable in any situation. It is therefore recommended that further research be carried out to examine the cultural impacts of project manager’s ability and performance and that the studies be conducted with subjects from diverse fields for future verification. Although there is an association between manufacturing strategy and implementation performance there is the need to investigate the effect of other aspects of strategic management and performance.

ACKNOWLEDGEMENT

This study is supported by University Malaysia Pahang research grant (RUD130375).
REFERENCES