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A concept of Technological and Managerial Complexity of Project Management in Khyber Pakhtoonkhawa, Pakistan

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Abstract

Purpose: The study aims as an engineering example of a single-objective Project Complexities (SOPCs) problem, Water Users Associations (WUAs) of On Farm Water Management (OFWM) and its use for a Project Complexities & Water Management (PCs & WM) model parameters prediction is presented in this study.

Methodology: A traditional method for WUAs training used herein is the well-known Background ladder method, which uses an umbrella based approach of project application and adaptation to the prevailing scenario and locale to minimize an output error. As a novel approach, umbrella approach of complex project can be used here for the same purpose.

Findings: It is shown that obtained errors are much lower than the outputs obtained from the Background ladder method. Next, an identification of the integration of complex projects as in David model. This model is a fully three-dimensional approach of Linear, Horizontal and Vertical Project Complexities and Water Management at different combinations of Project Complexities and Water Management along with the development of new model in the shape of Ladder Approach. The first main result is that the Complexities of Complex Projects Can be solved by parallel analysis in reasonable time and locale. The second outcome is the fact that the local minimas of the identified problems can be resolved through Umbrella Approach of Project Application and adoption method as well as statistical analysis. This will also minimize the need of training of locale peoples for a Water Management Project's work.

Keywords: *Project Complexity Management w.r.t. Water Management, (PCM wrt WM), The Project Complexities (PCs), Single-Objective Problems (SOPs), On Farm Water Management (OFWM), Project Complexities (PCs), WUAs, PCs WM model, Ladder Approach of David & Nash.*

INTRODUCTION

The proposed thesis mainly deals with problems associated with the Construction Engineering area and therefore the methods as well as problems have been selected with emphasis on applications to Civil/Construction Engineering topics. And also as nowadays very popular Project Complexity Management w.r.t. Water Management, (PCM) will be presented as one of the possible ways how to solve today's challenges. In this study two main Project Complexity tasks are described - the Project Complexity as a "management" problem and the Water Management as an "engineering" one. Several categories among Project Complexity problems are described and some solutions from the Project Complexity area are cited. Next, a new classification for Evolutionary Progress of Project Complexity is presented. It is based on the well-known notation developed for Project Complexity (David et al., 2000) and appropriately modified.

Traditionally, the Project Complexities (PCs) are for single-objective problems (SOPs) and not for compicated engineering multi-objective Project Complexity Problems (PCPs). Solutions for all the three phenomena are presented: multi-objective nature can be solved by Ladder approach of Nash for Project Complexity approaches, constraints by penalty functions and different types of variables by an appropriate encoding. Several other possibilities are discussed in the text as well. Therefore, the present effort is to highlight these issues with Technological and Management Complexities. The developmental projects are invariably complex therefore; this complexity from project to department needs to be studied.

As certain project characteristics determine the appropriate managerial actions required for the solution of complexities, therefore, the present effort will determine these managerial techniques. Another aim is the solution of engineering single-objective Project Complexity problems such as WUAs of OFWM and its use for a PCs & WM model parameters prediction is presented in this study. A traditional method for WUAs training used herein is the well-known Background ladder method, which uses an umbrella based approach of project application and adaptation to the prevailing scenario and locale to minimize an output error. As a novel approach, umbrella approach of complex project can be used here for the same purpose. It is shown that obtained errors are much lower than the outputs obtained from the Background ladder method. Next, an identification of the integration of complex projects I David model [David et al., 2000] is investigated. This model is a fully three-dimensional approach of Linear, Horizontal and Vertical Project Complexities and Water Management at different combinations of Project Complexities and Water Management along with the development of new model in the shape of Ladder Approach. The severe disadvantage of the Ladder Approach is its complicatation. Which can be reduced by setting appropriate goals so as can be tested easily. Next, a parallel version of the adoption of PCs -based on the already identified Ladder Approach of David & Nash is directly used to obtain required parameters by varying them within a new project for complexity analysis and adoption.

The first main result is that the Complexities of Complex Projects Can be solved by parallel analysis in reasonable time and locale. The second outcome is the fact that the local minimas of the identified problems can be resolved through Umbrella Approach of Project Application and adoption method as well as statistical analysis.This will also minimize the need of training of locale peoples for a Water Management Project's work.

EXPERIMENTAL TESTING

Problem Statement

The study is for the diagnosis of the project complexity. It studies the comparative analysis of the projects as in first world and its adoption in 3rd world. It is a work to ease the job of the project implementers in the undeveloped pockets of the globe for maximization of benefits and outcomes.

Aims and Objectives/Proposed Solutions

(1).The aims and objectives are to diagnose the projects complexity of the study.

(2).Project application and historical development of project complexity.

(3).Its adoption with respect to locale, effects and impacts.

PROPOSED ANALYTICAL MODELS &TECHNIQUES

Methodology

Keeping in view the objectives of the study an attempt was made at preplanning stage to design an applicable and workable research program. For this purpose all the relevant material about the project were collected and studied for the selection of the sample design and size, built an applicable questionnaire and the sample area was surveyed. The data collected through different methods was analyzed for data analysis through techniques such as simple random sampling method, SPSS, Primavera etc and finding results and discussion of the study.

Sample Size

It was difficult to study all the members/beneficiaries, therefore, 120 respondents from eighteen representative components of the Project Area have been selected and then respondents were randomly selected by following systematic random sampling. In each sample area 20% of the respondents were interviewed. In order to decide the number of respondents the following formula was used;

No of Households in one office (sample area) Y/Sample size of one sample area= No of household in all sample areas Z/Sample size of all sample areas W.

$Y/X=Z/W$

$X=(Y/Z)\ W$

Where W= Sample size of all sample areas

Y= No of households in one sample area

Z= No of household in all sample areas

X= Sample size of one sample area

Interview Schedule

For primary data collection a proper questionnaire was designed which was pretested at IqraNational University. After pretesting it was again pretested in the survey area and was reflected. The draft was finalized and then translated into local language/Urdu for the convenience of some of the respondents.

Data Collection

With the help of enumerator, it was explained to respondents to get them into confidence and interviewed.

Data Analysis

The data were tabulated through tale-sheets and SPSS etc and discussion of results were found then.

Sources of Data

Sources of data were the available record in different provincial offices regarding the project. The other sources of data were that available on net, the review regarding the problem and the data collection through questionnaire.

RESULTS AND DISCUSSION

Engineering

A model driven approach for cooperative work is necessary for water management projects. For a model driven approach for cooperative work about 15.1 % recommended the new model approach. About 25.5 percent just recommend it. So as a whole almost 40.6 percent of the respondents recommended the driven approach and satisfy the model for water management projects. Out of 106 respondents fifty-two respondents rejected the driven approach. About 8.5% respondents have no idea for this new driven approach. The average percent responses of all the respondents are shown in Fiqure.1.

The lead time of the project component is not the key indicator for efficient project execution. As for the lead time of the project component is not the key indicator for efficient project execution is concerned about 6.6 percent of the respondents strongly recommend the new model approach. About 17.9 percent just recommend it. So as a whole almost 24.5 percent of the respondents recommended the driven approach and satisfy the model for water management projects. Out of 106 respondents fifty four respondents rejected the driven approach. About 24.5% respondents have no idea for this new driven approach. The average percent responses of all the respondents are shown in Figure 2.

Management

1. Advance mathematical techniques are preferred for project optimization.

About 56.6% of the respondents responded that the advanced mathematical techniques are necessary for the new model approach,while 39.6 percent just recommend it. So as a whole almost 96 percent of the respondents recommended the driven approach and satisfy the model for water management projects. Out of 106 respondents only one respondent rejected the driven approach. About 2.8% respondents have no idea for this new driven approach.

2. Network Programming (weak, strong and hard) will be preferred for solving project complexity.

As for the appropriateness of the Network Programming (Weak, Strong, and hard) for solving project complexity is concerned about 34.0 percent of the respondents strongly recommend the new model approach. About 59.4 percent just recommend it. So as a whole almost 93.4 percent of the respondents recommended the driven approach and satisfy the model for water management projects. Out of 106 respondents only four respondents rejected the driven approach. About 2.8% respondents have no idea for this new driven approach.

CONCLUSIONS

This study mainly deals with problems associated with the Construction Engineering area and therefore the methods as well as problems have been selected with emphasis on applications to Civil/Construction Engineering topics. The Project Complexity Managment wrt Water managment is presented how to face today's challenging project managment problems. The two main Project Complexity tasks are described - the Project Complexity as a "Management" problem and the Project Complexity as an "Engineering" one. Several categories among Project Complexity problems are described and some solutions from the Project Complexity areas are cited. Next, a new classification for Evolutionary Progress of Project Complexity is presented. It is based on the well-known notation developed for Project Complexity (David et al., 2000) and appropriately modified.

The next part is devoted to the application of the presented PCs methods to the design of Water Management problems through a new system of Project Complexity Problems (PCPs) solution in addition to the multi-objective integration and adoption domain in the shape of ladder approach on the basis of scientists (Nash, 1995; David 1999). The first main result is that the Complexities of Complex Projects Can be solved by parallel analysis in reasonable time and locale. The second outcome is the fact that the local minimas of the identified problems can be resolved through Umbrella Approach of Project Application and adoption method as well as statistical analysis.This will also minimize the need of training of locale peoples for a Water Management Project's work.

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TABLES AND FIGURES

Table 1: A model driven approach for cooperative work is necessary for water management projects.

Status	Strongly Disagree	Disagree	No Decision	Agree	Strongly Agree	Total
Frequency	32	22	9	27	16	106
Percent	30.2	20.8	8.5	25.5	15.1	100
Cumulative Percent	**51% Disagree**		**8.5% No decision**	**40.6% Agree**		100

Table 2: The lead time of the project component is not the key indicator for efficient project execution.

Status	Strongly Disagree	Disagree	No Decision	Agree	Strongly Agree	Total
Frequency	22	32	26	19	7	106
Percent	20.8	30.2	24.5	17.9	6.6	100
Cumulative Percent	**51% Disagree**		**24.5% No decision**	**24.5% Agree**		100

Table 3– Advance mathematical techniques are preferred for project optimization.

Status	**Frequency**	**Percent**	**Cumulative Percent**
Strongly Disagree	0	0	0.9% Disagree
Disagree	1	0.9	
No Decision	3	2.8	2.8% No Decision
Agree	42	39.6	96.2% Agree
Strongly Agree	60	56.6	
Total	**106**	**100**	**100**

Table 4: Network Programming (weak, strong and hard) will be preferred for solving project complexity.

Status	**Frequency**	**Percent**	**Cumulative Percent**
Strongly Disagree	0	0	**3.8% Disagree**
Disagree	4	3.8	
No Decision	3	2.8	2.8% No decision
Agree	63	59.4	**93.4% Agree**
Strongly Agree	36	34	
Total	**106**	**100**	**100**

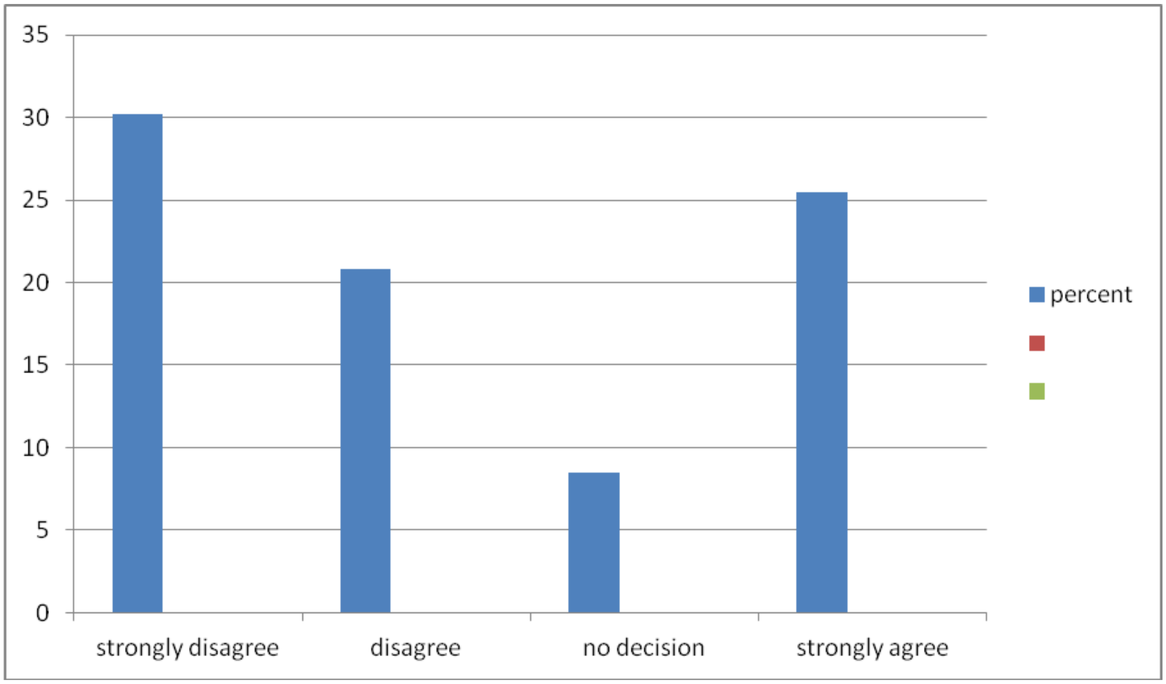

Figure 1: A model driven approach for cooperative work is necessary for water management projects.

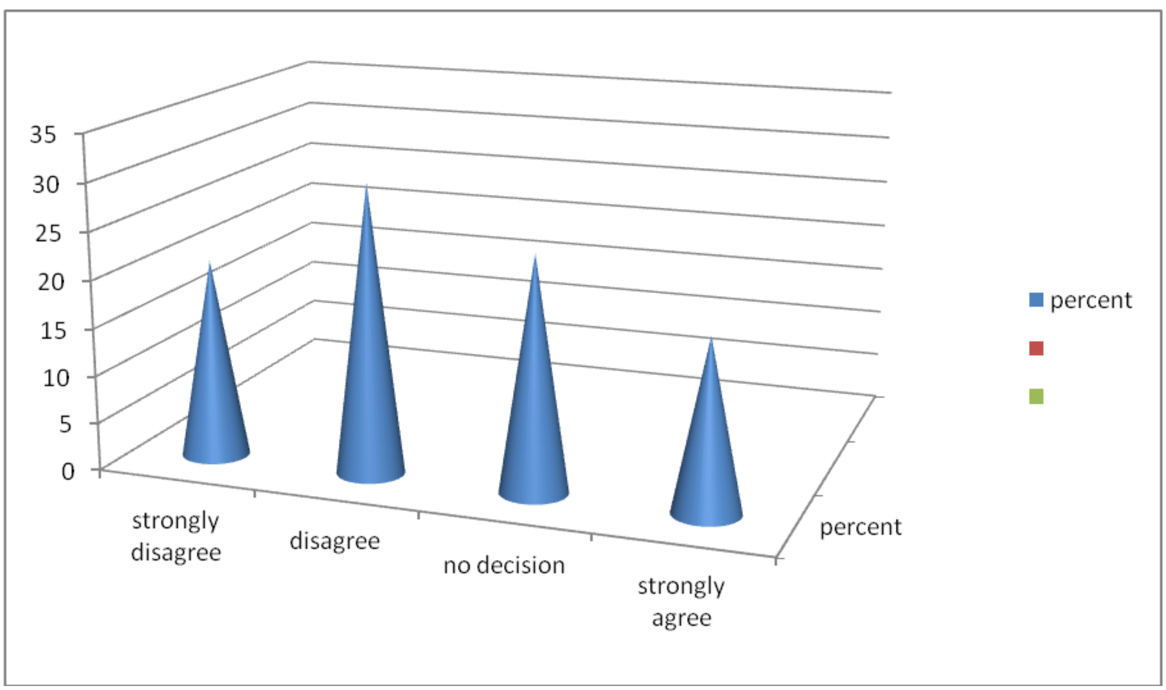

Figure 2: The lead time of the project component is not the key indicator for efficient project execution.

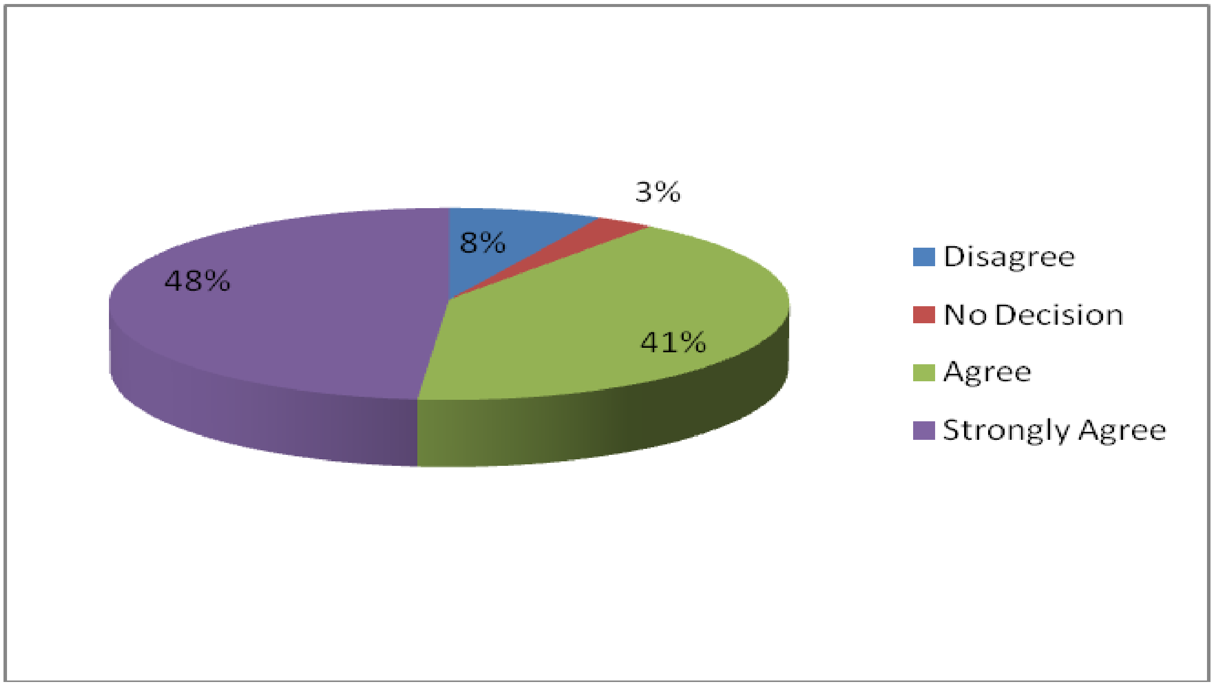

Figure 3: Average percent responses

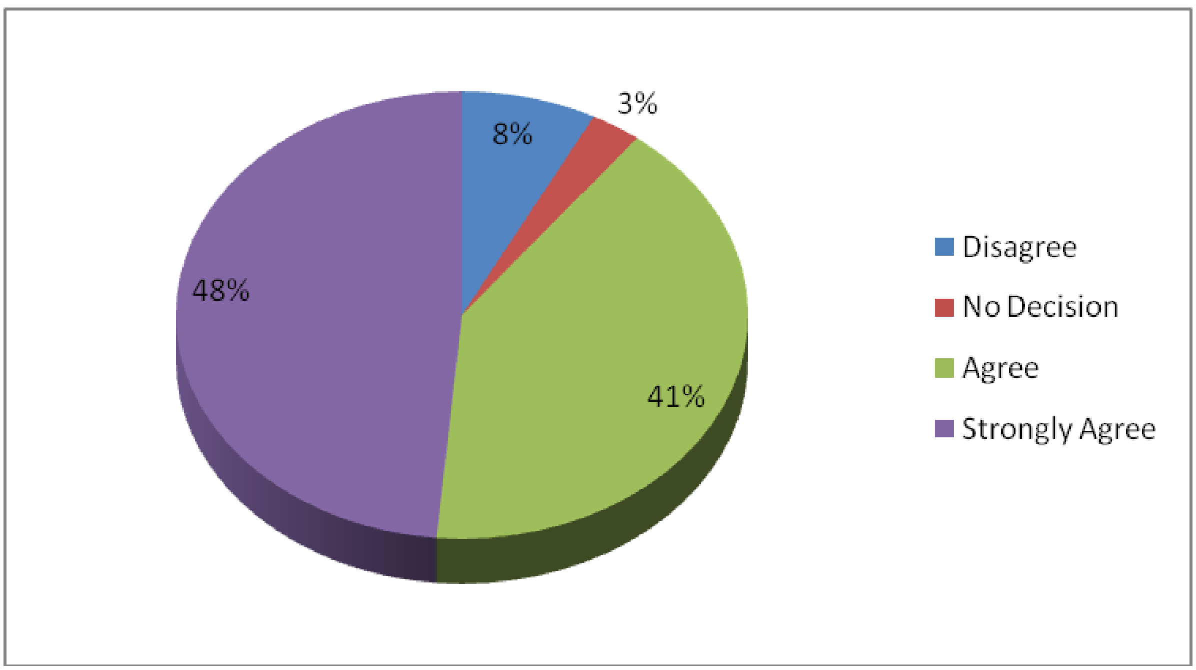

Figure 4: Percent response