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INFLUENCE OF FORMAL AND INFORMAL CONTROL AND COORDINATION OF GLOBAL SOFTWARE DEVELOPMENT (GSD) PROJECTS

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Formal and informal approaches of human behavior in working environment of global software development activities really influences the effectiveness and efficiency of many factors among team members. Formal control and coordination will help to follow the set of defined rules and regulations which will help to stick into standard procedures or frameworks. But in some situations in order to have the better understanding in the team, informal control and coordination plays a major role, so it would help to cope up well in the team members in order to achieve the goals and objectives of the projects. So the proper usage of both formal and informal approaches based on the need and situation will help for excellent control and coordination from the point of organizational framework and good relationship among team members. In this article, we have briefed the factors which mainly influences the formal and informal control and coordination of global software development activities.

Keywords: GSD projects, Defined rules, Informal control, Coordination

INTRODUCTION

Different type of approaches suites from one stage to another stages of the project to carry out the successful activities and processes to attain the required goals and objectives. Formal approaches are mainly to carry out as per the policies and procedures which are derived by the organization, informal approaches are mainly to keep up the good relation among the employees for better understanding. In some situations, informal approaches plays a major role for understanding the nature and behavior of particular person, it mainly understands and develops the good relation among the employees, which could help them to work under better and comfortable environment and circumstances.

Control and coordination tools are mainly rely on formal (process-oriented), in prescribed processes in work flow management systems. Formal approaches follow specific process models or policies, either implicitly or explicitly defined by software tools. They promote the separation of work into multiple, independent tasks that are periodically resynchronized. For the

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coordination of GSD teams, this approach suffers from two significant problems: First, formal processes can describe only parts of the activities of software development. No matter how formal and well-defined a process may see, there is always a set of informal practices by which individuals monitor and maintain the process, keep it on track, recognize opportunities for action, and acknowledge the necessity for intervention or deviation. Second, even when a process description attains a relatively high degree of detail and accuracy, the periodic re-synchronization of activities remains a difficult and error-prone task. In fact, the more parties are involved, the more conflicts arise and the more faults are introduced in the software at hand. These problems are inherent in any tool that relies upon a formal encoding of collaborative work, because formal processes are inevitably surrounded by a set of informal practices by which the formal conditions are negotiated and evaluated. Moreover, tools designed for a specific process can prove to be less effective when implemented within the context of informal practices, introducing the challenge of overcoming heterogeneity.

Informal approaches usually rely on the notion of awareness and it is an informal understanding of the activities of others that provides a context for monitoring and assessing group and individual activity. An example is the mutual awareness of activities that arises in shared physical environments, where we can see and hear each other and keep an eye out for interesting or consequential events. Informal coordination therefore needs to provide continual visibility, that is, awareness of concurrent actions in order to foster self-coordination. By continuously displaying the ongoing activities of others, users typically self-coordinate by avoiding areas of the document in which others are currently working.

SCOPE

The study is limited to the selected software companies in Karnataka. The software companies in Karnataka were selected taking into consideration various parameters like the number of employees, organization's age, investment outlay, global exposure and market share in the respective area of specialization.

RESEARCH METHODOLOGY

The present study has been undertaken to assess the Management of GSD projects in selected software companies in Karnataka. This section explains the purpose, design of the study, participants, instruments, procedure and statistical techniques used. Research on control and coordination of GSD projects is of great relevance to modern industry as it provides a new dimension to the understanding of how to deal with organizational problems in software industries. Since the problem to be investigated is relatively new, we have chosen an explorative approach.

The empirical study was accomplished through data collection from Project Managers, Team Leaders and software Developers experienced in working with software development projects involving software industries.

To obtain the data a well-designed and structured questionnaire has been used and the data for the present study was culled out from both primary and secondary sources. The secondary data is collected by referring the books and searching the websites to present the

conceptual foundation of the control and coordination of project.

The primary data relates to the perceptions of the software development professional groups are Developers, Team Leaders and Project Managers. At present there are more than 2,500 software development companies in Karnataka, and out of that 2,100 companies are located in Bangalore alone. In that, there are nearly 350 major software companies. For the purpose of the study, 10% of the major companies have been selected on random basis. From each selected software company 20 respondents were chosen for eliciting responses. When the structured questionnaires were served to all the respondents of the selected 35 companies, respondents from 3 companies did not respond to the request. Out of the responses received from 640 respondents, 140 respondents have failed to respond to the request in an orderly manner. Hence only 500 completed questionnaires in all respects were received and considered for the detailed study. The response towards management of GSD project was collected by serving a structured questionnaire on five-point Likert scale. For analysis and interpretation of data, weighted mean value, standard deviation, t-test was used.

The data processing was done through SPSS for windows (version 16.0).

PRE-TESTED QUESTIONNAIRE

Data from the literature and the pilot study was used to build the preliminary research framework suitable for software business environment of evaluation of Management of GSD projects. The pilot study was conducted prior to the formal data collection process in accord with the recommendation that conducting a pilot study is the final preparation for data collection. The pilot study helped in determining the usefulness of and assessing the reliability and validity of the instrument so that the researcher could refine the data collection plans with respect to both the content of the data and the procedures to be followed before final drafting of questionnaire is distributed.

Reliability of the Tool

Once the data was collected, it was entered into the computer software for analysis. The obtained Cronbach coefficient is .6225, where we can say that the tool obtained to measure the level of control and coordination of GSD project is reliable.

Validation of the Tool

The validation of the tool was established through face validity and content validity.

LITERATURE REVIEW

This section reviews the brief literature on influence of formal and informal control and coordination of GSD project.

Perrow (1967) has described that control and coordination approaches should vary with technology type. Task variability and problem analyzability were the two dimensions considered for categorizing the work situations. In situations where task variability is low and problem analysability is high, organizations willt end to have more formal structure in place to control and coordinate the activities. Conversely, organizations will adopt much more informal structures to control and coordinate the activities in situations where task variability is high and problem analyzability is low.

Coordination in software projects has been the focus of a number of investigations (e.g., Kraut and Streeter, 1995, Montoya-Weiss *et al.*, 2003, Andres and Zmud, 2001). From these, we can see that coordination works mainly by Absolute reductions in uncertainty: removing the variation and volatility that are the sources of uncertainty (e.g., by standardizing or formalizing procedures),

In a study on coordination mechanisms used in software development projects it was found that formal coordination enables project managers to bring projects to closure by reducing the performance risks and increasing control over process, whereas informal coordination leads to flexible software applications because it allows exploration of ideas and issues Nidumolu (1996). Kraut and Streeter (1995) in their study emphasized that it is very important to facilitate informal means of coordination as it helps in reducing uncertainty and facilitates problem resolution.

In Nidumolu (1995) study on coordination mechanisms used in software development projects it was found that formal coordination enables project managers to bring projects to closure by reducing the performance risks and increasing control over the process, whereas informal coordination leads to flexible software applications because it allows exploration of ideas and issues. Control and coordination of software projects plays a major role in the GSD projects success. There are two broad categories of control approaches, which are formal and informal approaches. Behavior and output control have been classified under formal control techniques whereas self-control and clan control are informal approaches. Formal control approaches are explicit in nature whereas informal control approaches are tacit in nature (Kirsch, 1996).

Krishna and Sahay (2000) have conceptualized that GSD is carried over local, global and shared arenas. The local domain is one in which people work in their respective individual locales. The global represents the domain when an individual physically goes to work in their counterpart's site. The shared electronic spaces enable developers to shared messages, data or software programs with each other. These three domains takes place like characteristics depending on how individuals relate or not relate to them. They remain as spaces till individuals develop particular relations to it and transform them into places. Globally dispersed projects have become possible not by substitution of informal approaches of managing projects by formal approaches but there is a distribution of both formal and informal approaches across individuals, tasks, locations and moments. Management of GSD projects has been an area of our interest.

Herbsleb and Mockus (2003) have mentioned that the communication, particularly informal communication, plays a critical role in virtual teams and GSD projects. These challenges relate to the lack of unplanned encounters among the developers, the cost of initial contact, the inability to communicate effectively, and the lack of trust and willingness to communicate effectively. Much of there search in coordination of software development assumes that coordination is coordinating activities to achieve a common goal. Multi-site work often lasts longer than same-site work and requires more people to accomplish a job of equal size and complexity.

ANALYSIS AND INTERPRETATION

Mean obtained and expected score on "Influence

Mean	S.D	Mean expected (min)	Difference	't' value	P value
3.50	.155	4.00	.49	71.23	.0
Source: Primary Data					

of formal and Informal Control and Coordination of GSD Projects" and results of one sample 't' test

The mean score for the entire sample was 3.5 out of the maximum score of 5. A minimum test value of 4.00 was fixed to see the agreement by respondents on the component 'formal and informal control and coordination approaches/ activities in GSD projects'. One sample 't' test revealed a significant difference having deficit from the test value of 4.00 (t=71.23; P=.0). On an average the sample did not reach the mean agreement on the statement.

FINDINGS

At different stages/levels of the project, the effective formal and Informal control and coordination activities/ approaches are low in selected software companies. The formal control and coordination is mainly to follow the set of framework and procedures, informal control and coordination is mainly to have the better understanding among team members.

CONCLUSION

Formal and informal control and coordination influences the success of GSD projects. Assessment of suitable control and coordination approaches is mainly differs from one situation to another situation. In most of the cases formal approaches will be used to carry out the formal activities, processes and operations. Informal approaches will be used to understand and set good mutual relationship among the team members. In majority of the cases formal approaches will be used more than informal approaches. Proper formal and informal approaches helps to motivate the employees in the organization.

SUGGESTION

Usage of formal and informal approaches at different project stage should mainly adopt based on the availability and requirement to solve and to understand the objective of the particular task/ activities. The importance of formal communication is to solve all the organizational problems, and the importance of informal communication is to understand the team members. In some cases people should use informal approaches, because it mainly enhances the relation and mutual understanding among team members. Employees should adopt both the formal and informal channels to solve the problems in order to ensure to achieve the goals and objectives.

In order to enhance the optimum utilization of the resources with respect to control and coordination, companies should adopt and implement the technology which gives the fast and good interaction with the good amount of reliability. Also to access the technical information, technical infrastructure should be well equipped and managed with the organization policies and procedure in order to maintain the confidentialities.

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