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Communication in the Project Team and a Role of a Project Leader-Hierarchical Network Approach

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INTRODUCION; HYPOTHESIS AND SCOPE

Success and failure in information technology (IT) projects depend on many factors. Based on the analysis of literature as well as Author's research and experience, we can build a working hypothesis of a significant influence of the communication system on a final project outcome in the context of:

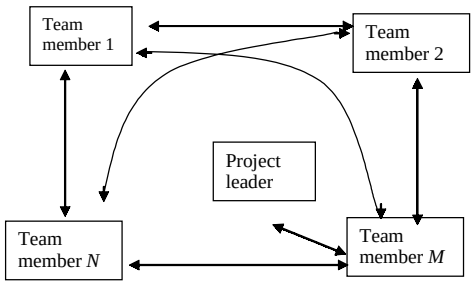
- Communication between the project team and the outside world (users, suppliers, other project teams, *etc*.)
- Communication within a project team.

In project management literature, communication occupies a significant position [J.Candle & D.Yeates (2003). H. Maylor (2003)]. Most research projects however, are focused on the analysis of communication between the project team and the outside world while communication within the project team seems to take a second place. From the literature dealing with building effective project teams, research carried out by L. Mullins (2001) deserves closer look. Mullins researched the key contradiction within a project team; he discovered that project leaders demand from their team members the willingness to compromise and subordination while at the same time they promote individualism and want to foster creativity. J. Chaffe (2001) on the other hand concluded that most people during their professional career loose both their creativity and individualism and prefer to conform to the existing standards. This is the very reason why some leaders prefer to build their teams from young people knowing that they lack experience. Another equally important factor in building effective project teams is selecting team members. J. Adair (1999) indicates three criteria that need to be taken into consideration while evaluation potential candidates: competence, motivation, and personal traits.

The subject of this paper is to prove the hypothesis that the communication system within the team significantly influences the its effectiveness. The key question that needs to be answered is: *what conditions the project leader needs to create in order to maximize the positive and minimize the negative effects of teamwork?*

While at the first glance this hypothesis might seem obvious, detailed analysis does not lead to decisive conclusions. While executing the project, teams could use different communication methods to both define the project tasks as well as evaluate results. The effectiveness of various communication methods can be very different therefore we want to prove the hypothesis that:

Diagram 1 Simple network communication system



THE NETWORK COMMUNICATION SYSTEM PROVIDES THE MOST EFFECTIVE FRAMEWORK FOR THE MANAGEMENT OF THE INFORMATION TECHNOLOGY PROJECTS

Network communication system is a system where communication between all team members is direct and cross divisional. In such system, the role of a project leader is not only to build the seamless flow of information between the team members but also to build trust between them. Simple network communication system is illustrated in diagram 1.

During my professional career in IT, Author went through all steps of a corporate ladder; from system analyst to a senior project manager in charge of large software delivery projects. Author researched effectiveness of many IT projects but did not investigate large projects from other industries like, for example, construction. Despite that, the results of this research can be adapted to any other industry since the primary focus was on the internal project communication, which is generic rather than industry-specific.

The logic of this paper is as follows:

- Section one; covers the analysis of the communication systems and their elements.
- Section two; covers a brief description of two most common communication systems: traditional, hierarchical system and contemporary, network-based system; both systems can exist in different variations.
- Section three; describes the recommended version of the network communication system, its benefits and limitations.

RESEARCH DESCRIPTION – ANALYSIS OF COMMUNICATION SYSTEMS

The analysis of communication systems was based on twenty two IT projects carried out between 1995 and 2002. The Author actively participated in twelve of these projects; the information about the remaining ten projects was based on project documentation as well as interviews with project participants. The main difficulty in the research is the fact that all projects are unique; (the ideal research would require an experiment where the same team would carry out the same projects at the same time with the only difference being the communication method). Therefore the conclusions of this research are based on estimates.

The majority of the projects included in the research targeted the business process improvement of the large organizations through the use of information technology. The project range was quite broad: implementation of IT in accounting for the major textile factory, improvement of the existing IT application in the insurance and pension institution, implementation of MRP II / ERP in a pharmaceutical

company, application of IT in a municipality of a large municipality, strategic application of a new IT for a National Bank, application of IT to improve the management of a large top-security penitentiary, and application of IT for education (use of information technology program for senior executives) *etc*.

These projects represent a very diverse group of IT implementations; eighteen of these projects were business applications for various industries and four were for non-profit organizations. Success was defined based on schedule, cost, and scope; the project was considered successful if a variance at project completion for these three metrics was 10% or less. Despite the fact that fifteen of these projects were classified as success, during their implementation, the teams had to overcome significant problems.

The size of project teams in each of these projects was twenty people or more. The teams were cross-divisional; they included both IT personnel as well as industry specialists. The selection of such teams allowed the Author to research a group that both required at least a three-level communication and could not be managed by one person. In such a project team, level one consisted of system analysts designing a system, level two consisted of operational managers or team leaders, and level three was a project leader accountable for the entire project. To complement the standard communication channels, (i.e., project leader to team leader to system analyst) the Author researched communication channels between project leader and systems analyst and between system analysts themselves.

The Author searched for answers to the following questions:

1. How effective are main communication channels within a project team?
2. What project management methods would ensure a seamless information flow within a project team?
3. What communication system is recommended for implementation of IT projects?

In the context of this research, effective communication is measured by earlier defined project success criteria.

The method of research is asymmetrical; the focus is on identification of causes of failure while a success is treated as a given. The methods of analysis are:

- Review of project initial documentation (preliminary analysis, business case, application specifications etc.) and project progress documentation (schedule, budget, delivered scope).
- Questionnaires for both project managers and project team members.
- Author's notes from the project meetings where the team discussed project issues, risks, and solutions.

The information from the project meetings was the key source for the analysis while project documentation and questionnaires provided the necessary background and were used for further result verification and diagnosis. Project documents and questionnaire results indicated there was a problem while the discussions were a source of recommended solutions. In most cases, the discussions were within the project team with participation of specialists from other project teams or from user groups. Each significant deviation from budget, schedule, scope was presented and discussed. Project documents and questionnaire results would then help verify if decisions made by the group were effective. One of the key questions from the questionnaire was: *Would you like to work with the same team on the next project?*

Occasionally, the Author used the experiment where he would pass specific information to one team member or a group, and measure the time it would take for this information to reach all project members. In such an experiment, the Author would send and email and check when the email is read, monitor the usage of project database, and monitor the usage of Internet. The results showed that there are two categories of the roadblocks:

- Communication roadblocks caused by external factors like delay in supply of required technology, project financial issues, incomplete documentation supplied by users, change in regulations, strategic organization changes with the organization being on the receiving end of the project, unplanned absence of a team member, *etc*.
- Communication roadblocks caused by the internal factors like: insufficient communication, lack of knowledge and experience in carrying out the project, personal conflicts within the team, errors in project managements, *etc*.

While external factors listed above affect the project in general, internal factors were strongly related to the flow information within the team.

Communication system within the team was evaluated using the following criteria:

- How significant was cost, schedule, and scope variance at project completion?
- How effective was risk management process?
- How effective was a conflict resolution process?
- Were team members willing to cooperate and share knowledge?
- Were the team members willing to work together on the next project?

Considering the scope of this paper, the Author presents only the most important facets of the research.

MAIN COMMUNICATION SYSTEMS AND THEIR ELEMENTS

The research includes two communication systems used by project teams:

- Network-based system presented in its simplified form in diagram 1. In reality, the network system is more complex, since besides the project leader there are also team leaders accountable for delivery of portions of the overall solution. Fourteen projects selected for this research followed such structure and used the network-based communication method. The diagram depicting communication channels in such structure is presented in diagram 4.
- Traditional, hierarchical communication system depicted in its basic form in diagram 2. Eight projects selected for this research used the hierarchical communication system.

Regardless of the communication method, all projects were using various aspects of information technology to provide a business solution: Computer Aided System Engineering (CASE), databases, Internet and email, or on-line cooperation.

All communication systems within the project team include basic elements presented on diagram 3 below.

Communication systems depicted on diagrams 1 and 2 consist of „bricks" presented on diagram 3. The communication system is effective only if all individual bricks function properly. The information flow between these individual elements – regardless of the used technology – is deformed due to various disturbances caused by:

Diagram. 2 Traditional three-level communication system

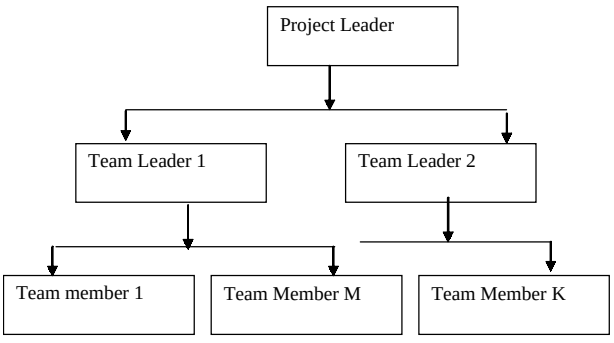
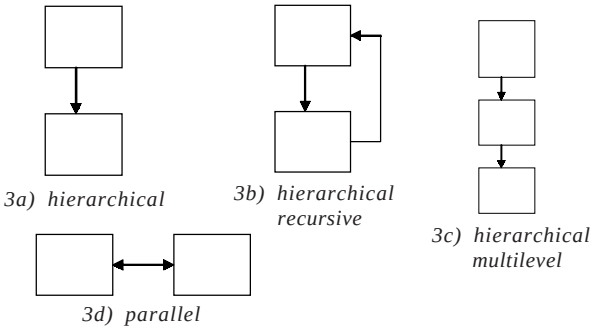


Diagram 3 Basic elements of communication systems.



- Technology; hardware and software cannot transfer the contents and/or form of the information.
- Semantics; the recipient cannot read or interpret received information.
- Pragmatism; delivered information does not add anything new to the recipient's knowledge and consequently the effort to receive information was a wasted.

Analysis of communication systems covered by this research proved that:

- Out of fourteen projects using network communication systems, eleven (80%) were successful.
- Out of eight projects using traditional hierarchical communication systems, four (50%) were successful. These four projects were MRPII/ERP-like package implementation projects.

As stated earlier, communication system is not the only project success factor. However, the answers to the question quoted earlier *Would you like to work with the same team on the next project?* were symptomatic.

- Amongst team members operating within the hierarchical communication system, between 60% and 70% of managers provided the positive answers while only 30% of system analysts provided a positive answer.
- Amongst the team members operating within the network communication system, between 70% and 80% provided a positive answer and there were no difference between the management team and systems analysts.

In addition, the number and magnitude of project issues were much smaller in project using the network communication as compared to the projects using the hierarchical communication.

The results of research on the speed of information flow proved that in the network system information flow was 30% faster than in the hierarchical systems. This research also proved the principles of management system design presented by M. Hammer in his business process re-engineering method. According to M. Hammer (1995), it is critical to eliminate the "middle man" in order to improve the effectiveness of communication. Other scientists also confirmed these principles in their research [J.Kisielnicki 2002].

Communication systems presented in diagrams 2, 3a and 3c are the least desirable and not recommended as in these systems a team member only receives directives. Such situation in reality cannot and does not exist; there is always an exchange of information where the team member at least informs a project manager about a progress of the project tasks. However, as stated in works [L.Grochowski, J.Kisielnicki 2000], in the hierarchical relationship team members reluctantly inform the project leaders about the project progress even though they consider it their duty. It seems that the reason of such behavior is psychological; when asked why team members withhold information from project managers, the answers were ambiguous. Also discussions carried out within project teams did not bring about a conclusive answer. However, during one-on-one conversations, it became clear that team members perceive a project leader as a competitor; the typical answer was: *If he is a project leader and receives higher salary, I will not advise him – it is up to him to make a decision.*

G. Morgan (1986), in his work on different organization writes that the hierarchy is a source of various conflicts between people. These conflicts are not about solving business problems; they are about people's position in organizational hierarchy. Based on observations, we can say that the situation is different when team members cooperate with each other and each individual's performance evaluation is driven by the evaluation of the final project outcome. In such environment cooperation becomes a necessity and knowledge transfer between team members is always significant. The leader's influence should focus on fostering, promoting, and demanding -when necessary - knowledge transfer between the team members. F. Savatera (1998) writes: *Greek preferred to solve issues with his equal rather than receive a solution from his Master; to make mistakes on his own behalf rather than to follow orders.* The Author believes that people carrying out IT project these days are such contemporary Greeks.

There are two categories of IT projects:

- Package implementation projects (for example, implementation of MRP II/ ERP) where creativity and individualism is not as important as following standards and proven procedures.
- Projects that deliver new and unique applications where team members need to use creativity to a certain degree.

Communication system presented in diagram 3b is effective in package implementation projects where it is critical that the system delivery procedures are followed. For projects delivering new applications, communication pattern presented in diagram 3d is more appropriate.

In a hierarchical communication system presented in diagram 2, the majority of elements is as presented in diagrams 3a, 3b, and 3c. In a network communication system, the majority of elements are as presented in diagram 3d.

NETWORK COMMUNICATION SYSTEM AND ITS EVOLUTION; COMPARATIVE ANALYSIS

In reality, the network communication system depicted in diagram 1 is used for project teams consisting of five to seven people. For larger teams, this model takes on a more complex form presented in diagram 4. This diagram represents a modification of the network communication system presented by Mintzberg (1999).

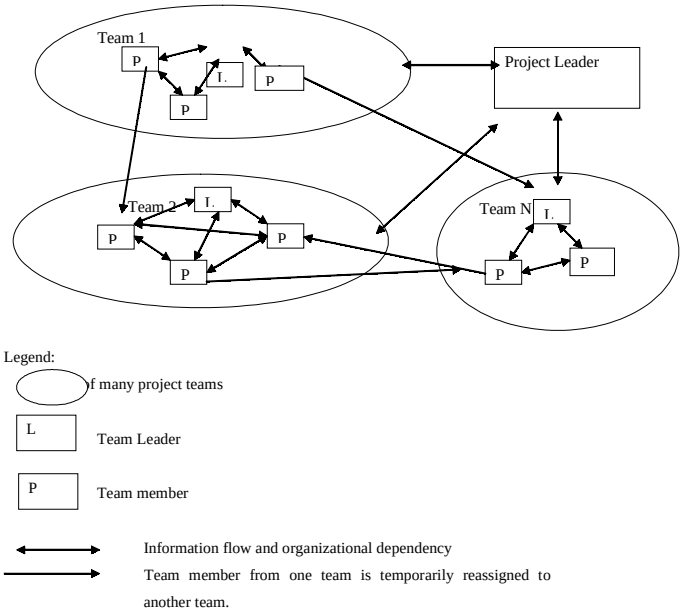
The network communication system (presented on diagram 4) is therefore recommended for implementation of complex IT systems. This system has been proven in several IT implementations projects; it was well received by the team members, and, what is the most important, it was proven effective.

The network communication structure presented in diagram 4 has the following key characteristics:

1. Division of the project team into smaller teams happens dynamically during the project using two techniques: PERT combined with the Critical Path Method (CPM) as well as Management by Objectives (MBO). These techniques are supplemented with the analysis of skills and personality traits of the individual team members; (team building methods will be a subject of a separate paper).
2. The network communication system is based on direct reports. The only person responsible for the entire project is a project leader. Team leaders have dual responsibility: they are both team leaders and team members (system analyst, business analyst, *etc*). During the project, after teams have completed their tasks, they were re-organized; the team leaders as well as team assignments would change.

   Colloquium on *Participant-Centered Learning* organized by Harvard Business School in 2002 followed a very similar pattern; during discussions on various case studies, both team leaders and

Diagram 4 Organizational structure and communication flow in a network-based project team.



team members would periodically change. During the entire session the Author was a team leader only once and every week he was working in a different team. All participants accepted this method as obvious and natural. Also in the researched IT projects the team accepted the changes in team leaders. These changes were introduced and explained at the beginning of the project. Financial aspect of the team leader position was such that the position of a leader required additional effort as well as different skills, and was considered recognition. However, it did not trigger additional compensation. While changes in the team leader assignments worked well, reassignments to different teams were not. The reasons were two-fold:

- Schedule; different teams finished their deliverables in different times.
- Personal relationships created during the project between the individual team members. This was the significant element supporting a strong communication within the individual team.

3. Participation of team members from one team in achieving tasks of other team. For example, selected group of more experienced team members would spend 20% to 30 % of their time assisting in completion tasks from other group. This arrangement builds the relationship between the project participants and facilitates the flow of information as well as knowledge transfer. Methods PERT/CPM as well as (MBO) help decide which teams should share resources in this manner.

CONCLUSION

Research on effectiveness of both communication systems indicates that the network communication systems are superior to the hierarchical system in the following aspects:

1. **Progress monitoring**
   Possible deviations from scope, schedule and budget were communicated earlier in the network system than in a hierarchical system thus allowing for earlier intervention.
2. **Cooperation and knowledge transfer**.
   There was a strong cooperation as well as knowledge transfer between team members; there we no artificial barriers (*i.e.*, manager against worker). Each team member was or could be a team leader depending on the need and situation.
3. **Problem solving**
   There were fewer conflicts within the network structure. The problems that did occur were less intense and they were resolved faster than within the hierarchical structure.

Network communication system, to be effective, requires that several conditions are met. The most important one is the competence of individual team members and their willingness to cooperate. This system is difficult for so called individualists as well people preparing for a project management career path. In the recommended system, career path is leads towards professional development but does not provide a stepping stones from a system analyst position to a project leader position. It is also a system difficult for the project manager whose responsibility stretches from hiring and organizing the team members, as well as creating atmosphere conducive to open communication and cooperation. Comparing to the hierarchical system, project leaders of network organizations need to delegate more of their duties to the teams while they retain full accountability of the overall project success. For this very reason many project leaders prefer the hierarchical system as easier to execute and to enforce the timeliness of delivery.

These conclusions however, still do not provide a decisive answer the following questions:

- Which of these two systems is effective for all IT projects?
- What is the efficiency of replacing the hierarchical system with a network system?

Each business process needs to be both effective and efficient and an information system delivery process is no exception. There are many contributing factors that influence both its efficiency and effectiveness. Therefore in conclusion the Author would like to point out that the communication system, however critical to project success, is only one of these factors. Additional influence comes from the team makeup and as well as motivation techniques. The hiring and team building has been briefly discussed already. The effective motivation system, while critical to the overall communication strategy within the project team, is a separate topic. Effective motivation system also depends on the organizational culture, overall state of economy (the job market in particular) as well as the country itself; different motivation system will be effective in India, Great Britain, Poland, or United States. Communication system remains a key component in building effective teams since it is independent from team make-up and utilized motivation techniques.

REFERENCE

Adaira, J. (1999) Decision Making and Problem Solving (Management Shapers), Chartered Institute of Personnel and Development (CIPD).

Cadle, J. Yeates D. (2001) *Project Management for Information Systems*, Prentice Hall, Harlow, London

Chaffee, J. (2000) The Thinker's Way: 8 Steps to a Richer Life, Little Brown Co.

Grochowski, L., Kisielnicki,J. (2000). *Reengineering in upgrading of public administration: modelling and design*, International Journal of services technology and management, vol.1 4 p. 331.

Hammer, M. (1995) *The Reengineering Revolution*, HarperBusiness 1995

Kisielnicki, J. (2002). *IT in Improvement of Public Administration* in Cases on Information Technology ed by Mehdi Khosrow-Pour, Hershey, London

Maylor, H. (2003). *Project Management*, Prentice Hall, Harlow, London

Mintzberg, H, Van der Heyden, L. (1999) *Organigraphs: Drawing How Companies Really Work*, Harvard Business Review, Sept.-Oct. p.87

Morgan, G. (1986), *Image of Organization*, SAGE Pub. Newbury Park – London.

Mullins, L. (1993), *Management and organizational behavior* Pitman Publishing London,

Savatera, F. (1998), *Polityka para Amador*, Editorial Ariel S.A., Barcelona.