

# INFLUENCE OF MOBILE COMPUTING ON ORGANISATION OF PROJECT MANAGEMENT IN CONSTRUCTION

**B.Sc. Nataša Šuman, Prof. Mirko Pšunder**  
*University of Maribor, Faculty of Civil Engineering, Slovenia*  
[natasa.suman@uni-mb.si](mailto:natasa.suman@uni-mb.si)

## Summary

Today's set up processes in managing projects at the construction site are to a great extent supported by fast exchange of information between all members of the project team. That has been made possible by the fast development of information technology. Especially the use of mobile computing can significantly improve the information exchange, enables more effective preparation of activities, better communication between team members, and makes management of contractors considerably easier. This paper describes the applicability of integration between mobile computing components and project co-ordination at the construction site. Special attention is given to the organization of construction projects. Project team members who are hierarchal organized, are often dislocated and therefore the support of mobile computing can significantly improve their communication.

The paper gives some suggestions for the future use of mobile computing in construction and demonstrates the reduction of time and costs in case of its use.

**Keywords:** mobile computing, project management, construction site.

## 1. Project management in civil and building projects

### *1.1. Construction projects as set up processes*

A project is a final process in formation and implementation of certain activities that are logically interlinked, in order to reach the project target and to ensure, through subsequent linking of activities, that object and intentional goals are gradually attained. (Hauc, 2002). Further more projects are divided between continuous and single processes. Civil and building projects are single goal-oriented processes of activities which should be performed in order to erect new structures or to reconstruct the old ones. When considering an engineering company it can be notice that they carry out a multiproject operation.

On civil and building projects as investment project they undergo through four main phases: conception phase, definition phase, phase of preparation for realization and realization phase. For those projects the overall goals are always purposeful for assuring timely, quality and economic erection of structures (Pšunder, 2002)

Theirs specific are displacing project partners from location of project performing. Hence, special attention is given to transmitting a large quantity to relevant project

members on different locations. Practical experience shows that considerable gap in information and communication area. The information needed for decision-making is processed to slow Nowadays a rapid development of information technology offers us numerous opportunities for mutual communication.

### ***1.2. Project organization design/structure***

The term project organization represents an organizational structure for project management and implementation within the framework of the existing organization of company or some other system (Hauc, 2002). It defines the relation between project management, project team, performers. There is no universal system to organize activities of the project; therefore the first step to assure connections between project members inside and outside the company is to choose the right organization type. The responsibility should necessarily be institutionalised and organized either by the investor or by the engineering company.

Presently two generic type of project organization structure can be recognised: functional or matrix. First one is intended for temporary project carried out in investment companies and second one is for permanent project carried out in engineering companies (Pšunder, 2002). There is a question what kind of organization structure will be suitable for management multiproject operations?

The matrix organization has been used successfully as a structure to manage internal multiprojects but for manage external project such an organization is not enough. According to Hauc (2002) insertion of new organization unit is needed; therefore is for function management bring in an organization of project management. At it shows at Figure 1 matrix organization become modified with the bellow structure possibility:

- top management with project management as internal investor,
- middle management with project manager and their technical, planning, project and administration support,
- low management with leadership of organizing unit and its caretaker and
- services as performers.

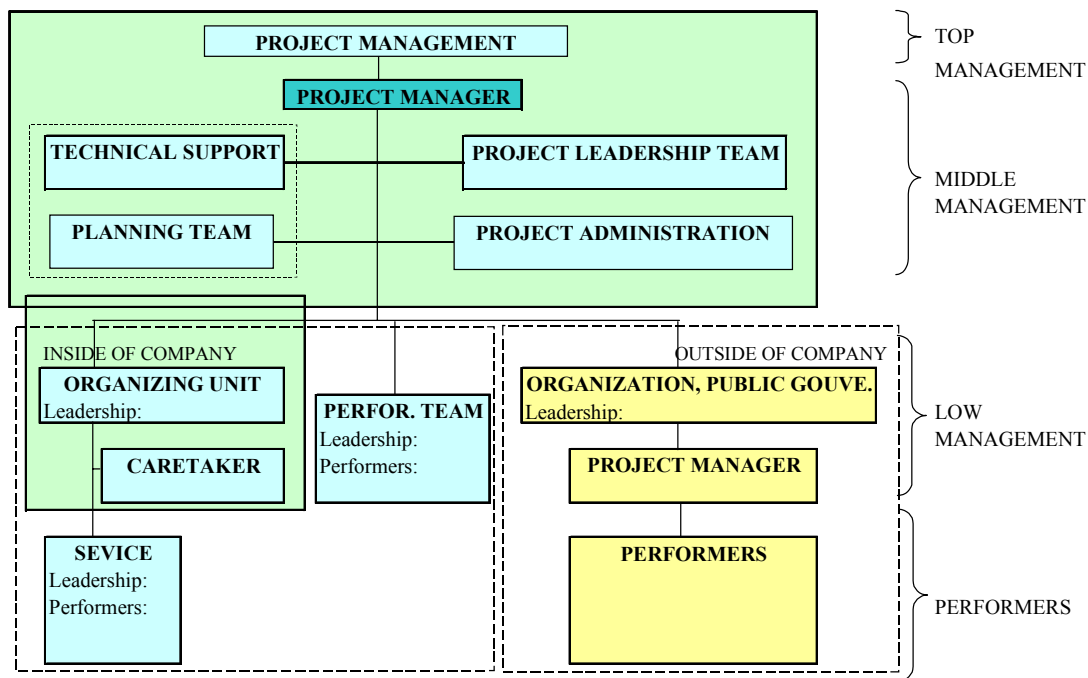


Figure 1 – Existent communication system in project organization design

In existent communication system there is a lot of weaknesses: poor communication with the external environment, while horizontal communication at the lowest levels is merely verbal. Hence, become to duplication of information, there is varying interpretations of information, the management receives large amounts of information, which imposes more responsibilities upon it, making it overburdened, and also, feedback information is insufficient or too slow (Vecchio, 1995).

Trend in engineering companies is to concentrate on human knowledge, which is become main recurs in modern society. The structured form that emerges is network with project manager at the centre. Decentralize of competences gives manager chance to use performer's process knowledge (Engineering, 2002).

## 2. Part of mobile computing in construction

### 2.1. An overview of mobile computing

According to Rebolj et al. (2001), mobile computing, in the language of information technology, stands for a group of mobile systems, and represents devices, networks, as well as a wide range of user services. Their use ensures remote transfer of messages and data, and constant accessibility of individuals, at any place and any time. All this make project members quickly responds and carry out activities efficiently.

If we say that data is the lifeblood of all projects, then in efficient communication mobile computing definitely does carry a weight of its own. Three and a half decades have already passed since the first telefax devices, and today at our disposal we have intelligent mobile phones, portable, tablet and palm computers, which, combined or on their own, represent genuine mobile offices.

Using of multifunctional terminals gives us a lot of benefits for increasing the manoeuvring space for coordination, management, as well as formal and informal communication and conflict solution, etc (Lesikar et al., 1993). There are main functional benefits:

- constant accessibility of members or data,
- meeting can go by audio/video conferences,
- online access to common bases, the intranet, and the internet, and
- integration of modern mobile services enables automated communication between hardware and software (Rebolj, 2003).

All those give user the availability of more time, which may devote to the operative execution of the project.

## ***2.2. Mobile computing enable processes more effective***

Engineering companies are aware that they need to improve process of mutual coordination. As alternative it seems on making information and communication system more dynamical, flexible, interconnected and easy to use what can be achieved by supporting of mobile computing. Implementation of such an optimum of data flow does control over information distribution and satisfies the needs of participants at all levels. The information needed at a given moment is processed, quickly and towards the participants concerned. All this represents a simplification, and the introduction of a more economical workflow, with savings expected at common level (Frehe, 1995).

Time saving:

- wherever they are, field workers always have the information at hand, whereby it is possible to make decisions faster,
- less time is required for obtaining important information, with online access,
- the opinion exchange flows in a decentralized manner, involving all participants through different means of communication and
- there is less administrative work.

Cost savings:

- reduced variable costs of direct salaries,
- reduced rental fees, costs of accessories and services,
- reduced overhead expenses.

## **3. Modification of project organisation**

### ***3.1. Mobile computing extended communication system***

Important acquirement of mobile computing does built an extended communication system. As shown by Figure 2 the existent communication system are extended in way that a link is established between the project manager and the entire organization. Communications flows are vertical and horizontal through all levels to internal and external environment. There is an acting horizontal information flow at lower levels. The communication system becomes dynamic, what bring the project more controlled and from the aspect of economic feasibility, such transmission channels are the most convenient, due to time-saving and, consequently, reduction of expenses.

Communication among participants who are solving a problem can, at the right moment, proceed through video conferencing or, even more so, through participation in an integrated communication system, which contains all project data (drafts, schemes, photographs, files, contractual relations and obligations, financial information, etc.), accumulated on a single location and accessible to all those invited to the project shared space (Agroove@2003). The effect is synergetic cooperation whereby the solution is given in digital form.

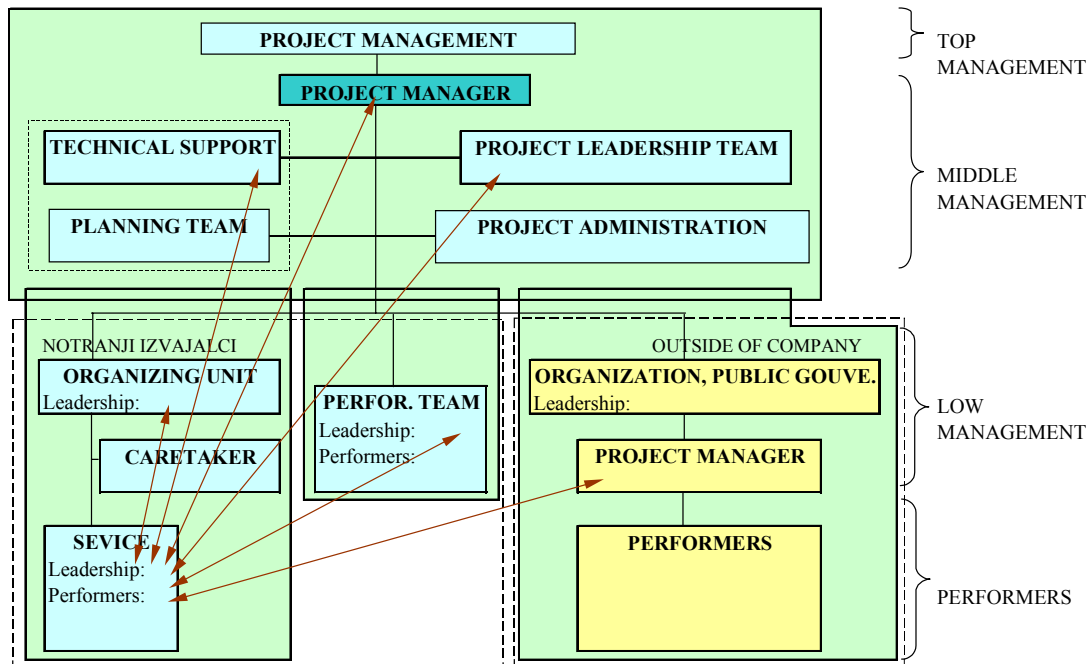


Figure 2 – Extended communication system in project organization design

#### 4. Conclusion

Nowadays it is almost a stereotype to say that we are living in a time of fast changes. However science and technology and consequently social relationships are experiencing huge progress which is to a great extent due to the drastically development and rise of information and communication technology. The result is a modern society, with characteristics such as hastiness, reciprocity of action and universality. All this inevitably demands changes in business operation of companies. Changes are needed in the area of communications, organizational structure and the nature of activity, all in order to adapt to new conditions as quickly as possible.

In optimising the processes of civil and building projects, mobile computing must be identified as an outstanding opportunity. Their utilization is by no means a process that we implement and then forget about – constant market analysis and monitoring is a necessity and, accordingly, the communication and information system must be adapted and complemented adequately.

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