

Diffusion of innovation and adoption of workflow management system in small enterprises

Metka Zemljč
Maribor, Slovenia
metka.zemljic@gmail.com

Abstract - Projects are evaluated from different perspectives, usually time, financial and quality perspective. There are many tools that project manager can use to help with the overview of tasks, communication process, progress of project etc.

Based on a case study we describe how diffusion of innovation – introduction of workflow management system happens in small enterprise, which brings more control in different areas, as it brings some disadvantages. We define specialties of adoption process and what consequences does innovation bring. In described case was innovation decision authority driven. New workflow management system was designed by extreme programming, which means progressive design of workflow management system based on needs of workers and project managers. As we analyze the whole process, we also suggest ideas for further improvements.

I. INNOVATION AND DIFFUSION PROCESS

Innovation is idea, practice or object that an individual or a group recognizes as new.

Rogers [1] describes innovation as process of introduction of activities, which vary from one firm to another. Innovation is application of new ideas to products, processes or any other aspect of firm.

Process, in which an innovation is communicated through certain channels over time among the members of social system, is called diffusion. [1] Messages in communication are about new idea. Diffusion could mean planned and/or spontaneous spread of new ideas.

Rogers [1] defines four main elements in the diffusion of innovations:

- Innovation (idea, practice or object recognized as new by individual or other unit of adoption)
- Communication channels (means, which transfers messages between individuals)
- Time (length of time required to pass through the innovation-decision process, rate of adoption or relative speed with which an innovation is adopted)

- Social system (set of interrelated units that are engaged in joint problem solving to accomplish a common goal).

Individuals go through innovation-decision process, which means individual goes through different stages before adopts or refuses innovation. Five main steps are knowledge of an innovation, persuasion (the formation of an attitude toward the innovation), decision to adopt or reject implementation and use of the new idea and confirmation of this decision. [1]

A. Technology innovation

Diffusion of innovation is often understood as technology innovation, since societies were and are able to benefit from evolutionary development through the process of technology transfer. [2]

We can see the interaction between innovation and diffusion in various stages of technological development.

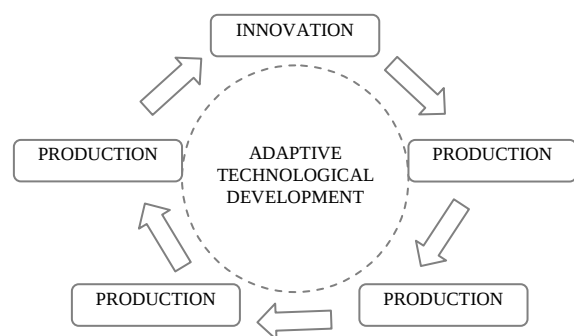


Figure 1: Various stages of technological development: interaction between innovation and diffusion [2]

B. Innovation in organizations

In organizations there usually prevails one of two types of innovation decision: collective or authority innovation-decisions. Collective decision is made by all individuals in group, authority decision on the other hand is usually made by few individuals who have the power or position to influence.

Implementation does not always directly follow the organizational decision to adopt innovation. [1]

Organizational innovation process consists from five main stages, similar to the process of innovation-decision by individuals:

- Agenda-setting,
- matching,
- redefining or restructuring,
- clarifying,
- routinizing.

However, innovation process is much more complex than innovation-decision process by individuals. Implementation typically involves a number of individuals who play a role in innovation-decision. [1]

II. CASE STUDY: DESIGN AND ADOPTION OF WORKFLOW MANAGEMENT TOOL IN SMALL ENTERPRISE

Interpretative case study, unstructured interview with management and analysis of process were used for the survey. Our main objective was to identify the diffusion of innovation process with use of agile methods for software design.

Case study analyzes process of innovation diffusion in small enterprise from Slovenia, BuyITC d.o.o. Firm's core business is design of software and internet solutions, like web portals, intranet, and other business applications. It has 12 employees, who work on physically same location; however there was a need for better workflow management recognized. Project manager organizes work and communication between customers, application designers, programmers, graphic designers and coordinates timeline with leadership. Projects are evaluated from different perspectives, usually time, financial and quality perspective.

There were many existing tools for task and workflow management identified, which did not meet all the managements' needs: compatibility with existing time attendance application, adequate task management system for specific tasks, effective control over workflow and reporting.

Diffusion of innovation was recognized on two levels. First is the level, where decision about innovation was made by firms' management. On second level, design of new software for workflow management was interlaced with diffusion of innovation process among individuals (employees). Due to lack of adequate software and needs of employees, decision to adopt the innovation was made.

A. Organizational innovation process

Innovation process was driven by authority innovation decision, although also some employees, especially projects managers, recognized the need for a tool for better workflow management. Management went through stages of innovation process [3]:

- agenda-setting,
- matching,
- redefining/restructuring,

- clarifying, and
- routinizing.

The process was interlaced with design and use of new software.

B. Innovation-decision among individuals

Life cycle of extreme programming [4], method used for design of the new software, consists from five stages:

- Exploration phase,
- Planning phase,
- Iterations to release phase,
- Productionizing phase,
- Maintenance phase,
- Death phase.

The "iterations to release phase" constitutes of many repetitions and testing of the system. In this phase all the employees actively participated. Although innovation-decision was authority driven, decision for use of the software in this phase was optional. Therefore, diffusion of innovation process occurred. We could classify all the employees in four of five Rogers's adopter categories. [1] Innovators and early adopters were the most active and also contributed the most in the process. Late adopters were last to use the application. Some employees also rejected the use of application in their decision process, but were invited to actively suggest necessary improvements. This raised the level of motivation among all employees, which contributed with many innovative changes.

In this phase most modifications to first version of application were made, especially to uphold the needs of certain jobs. Compared to previous project, the result was better final product at the end of design phase.

III. CONCLUSION AND FUTURE WORK

Through case study we introduce a different perspective of innovation diffusion. The design of new software is interlaced with diffusion of innovation on different levels. New software was demand-induced for the needs of better workflow management. Extreme programming as an approach of software design was proved as efficient approach, whereas it brings quality software, better user experience with final version of product, with reasonable costs.

Through innovation diffusion among employees (future users of the software) many improvements of first version of the product were made. Opportunity for participation also motivated late adopters and those who were firstly not willing to use the software.

We conclude that similar process would happen with clients, if firm would participate with such approach in "Iterations to release" phase. In order to maintain similar results, this would require clients to provide their own testing groups. The approach would also require definition of protocols and efficient communication to achieve satisfactory level of efficiency.

The approach needs further study, especially analysis of case studies where firm cooperates with clients in “Iterations to release” phase.

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