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CREATING THE AGILE PROJECT ENVIRONMENT: DEVELOPMENT OF EFFECTIVE AGILE TEAMS

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Abstract: *Agile methodology is a very significant part of project management approach. This methodology inquiries different model of project teams organization, in a certain way different from traditional methods. Effective teams are main chain in agile development approach, so they are in direct connection to success or failure of project. This paper shows main directions of human resources development within agile project management.*
Key words: *Human resources, Agile project, Productivity*

1. INTRODUCTION

Modern concept of organization and processes management is based on Information and communication technologies (ICT). Unpredictability and dynamism of the environment requires implementation of new organization and management methods and techniques in business processes.

Also, new agile methodologies of product development are required. ICT become an indispensable part of most processes with a significant influence on rapid development of ICT products.

Changes are constant and technologies advanced intensively, which make R&D processes more complex regardless of whether these processes are in enterprises or Universities. These new methodologies require creation of multidisciplinary development teams who have a significant experience and clear development vision. Agile team must be formed from people who are ready to work in highly variable environment.

Creation and development of effective agile teams represent both a considerable challenge and a significant opportunity for organizations of the 21st century.

2. TEAM ORGANIZATION AND COMMUNICATION CHANELS BEETWEN MEMBERS

Efficiently organized team represents the base of agile development in domain of IT industry. The goal of each software business organization is to maximize team productivity due to cutting expenses and increased profitability [1].

The main characteristic of agile approach is that team work in small groups. Small teams are more flexible to performing activities than larger ones. Therefore, smaller number of people in a team provides easier communication than when we have many people. The advantage of small team is in better interaction among their members. With smaller number of people, everyone is in interaction with each other. Forming effective team is crucial activity in agile project management.

Characteristics of agile team are ability to change roles in team in case that individual person is not successful in some field. Agile teams easier conduct work strategy, because they consist of smaller number of people.

The agile management approach works in way that teams have high level of autonomy, and members are independent from leader. Important thing to say is that those teams have not straight hierarchy between members. The leader primarily must protect team from negative influences and give useful advices related to business. Relations in agile team should be based on cooperation, mutual respect and tolerance. As this team function without a leader, members of team must make a decision independently.

The advantages of agile team:

– Getting faster information;
– Easier to change opinions;
– Better decision understanding;
– Considerate different problem solutions.

One of the most important performances for people which are members of agile team is communication. When we speak about communication channels within agile projects, efficient control of these channels is the most important element in that particular field.

For project to be considered as agile, it is need to be formed communications channel between users, development team and stakeholders. Therefore, it is a significant to choose right way of communication such as a "face to face".

Communication between members must be in both directions. In this way information are carried directly and members get instant recurrent information.

Another way of communication that is serious for agile management is organization of meetings. Meetings are good way for a controlling realization of project and getting information necessary for further improvement.

Agile development methodology demands from members to communicate casually. For an example, every day in Scrum teams they have meeting where is discussed about achievements and what next shall be done.

Informal team has several advantages as follows:

- Development of team can express their creativity;
- There are positive atmosphere in team;
- Increase productivity;
- In this way the team is adopted faster and easier to changes (Fig 1.).

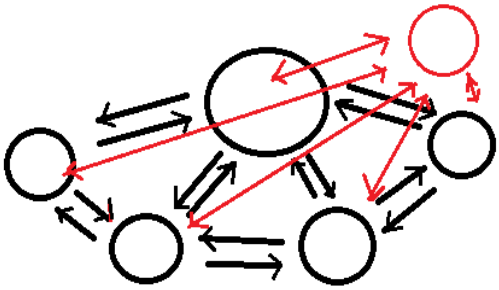

Fig 1. Informal communication channels

In order to develop effective agile teams it is necessary that information be provided at the right time and at the right place. Also, formal communication channels need to be described in more details.

Number of informal communication channels is a significantly higher than number of formal channels. These channels need to be identified; it is necessary to provide smooth communication among team members. Special attention is put on communication channels between "product owner" and team. This is needed to be organized as a formal type of communication.

3. MOTIVATIONAL FACTORS OF AGILE TEAM

Members of team should be motivated in a way to maximize their potential. Motivated people and their satisfaction are basic source of competitive advantage on the market. Each particular job affects employees differently. There are a lot of circumstances that affects work. Employees are mostly motivated with personal achievements, which support them for advancement.

Programmers and other members of team want to work freely without pressure of leader. On the other hand, their independency need to be followed by high quality of their work Thus, it can be said that quality of their work depends on level of their motivation.

Most of ten motivation factor for IT experts (from the strongest to the weakest) are [2]:

- Achievement;
- The potential for growth;
- Individual work;
- Recognition;
- Progress;
- Technical supervision;
- Responsibility;
- Relationships with colleagues;
- Relationships with subordinates;
- Salary.

The relationship between communication and motivation in agile team is very strong. It is high level of connection, because communication is very important for exchanging information, feelings and thoughts. Without good communication channels, in agile team, is not possible to motivate people. This feedback is highly important and represents key of success.

Leader a team the end every sprint, must to indicate the importance of good job and to give employees stimulus to continue working. One manager describes this as one of the most significant changes with Scrum "Pushing and motivating the team members to organize and take responsibility instead of organizing the team" [3].

Conflicts are common in team and can reduce speed project development. Most common cause is a conflict between members of team which spend too much time together.

Because of that in some cases leader is a mediator between members. He is a person who is in charge for cooperation inside team and controls every clash adequately. At the same time he reconciles participants (Table 1.).

The most common causes of stress in agile team are

- Constant interpersonal conflicts;
- Too much control;
- High responsibility;
- Unclear tasks;
- The conflict about redistribution of roles in the team;

– Excessive workload;
– Untapped potential;
– Wrongful system rewarding business.

Table 1. Expression coflict on each level [4]

Coflict level	Successful response options
Level 1. Problem to Solve	Collaboration. Seeking a win-win situation. Consensus. Learning where every team member's head is with regard to the issue and, in time, arriving at a decision everyone can back.
Level 2. Disagreement	Support. Empowering the other to resolve the problem. Safety. Anything that restores a sense of safety, such as collaboration games or regrounding in the team's shared values.
Level 3. Contest	Accommodate. Yielding to the other's view when the relationship is more important than the issue. This is a successful short-term strategy only and becomes a liability if used often over the long term. Negotiate. When the "thing" the conflict is about is divisible, such as the use of shared resource, negotiation can work. Negotiation will not work when the issue revolves around people's values. Values are not divisible, and one person giving is to another in violation of their own values feels like a sellout. Get factual. Gather data about the situation to establish the facts.
Level 4. Crusade	Establish safe structures again. Use "shuttle" diplomacy, carrying thoughts from one group to the other until they are able to de-escalate and use the tools available at lower levels of conflict.
Level 5. World War	Do whatever is necessary to prevent people from hurting one another.

Decreasing amount of stress in organization means that accomplishment is improving. Also, there is appearance of increasing motivations for jobs.

4. PRODUCTIVITY AND FOCUS ON ACHIEVING GOALS

An organization is always streaming to improve the overall organizational productivity. Organizational productivity is dependent on individual and team productivity. Thus improving software development team's productivity results into improved organizational productivity. The productivity improvement is part of team development. Hence, one should try to increase the productivity of software development teams resulting into the better organizational productivity and performance. [1]

Agile team must be constantly focused on what they are doing. The increased productivity and demands for personalized products are the main issues related to the achievement benefits from flexibility [3].

The average agile team focus is about 80%. The picture shows focus beloved 80% which means some influence on it or solving problems in other way. It is possible to achieve focus at 100%. That explains maximum dedication to goals. Also, it is not good because it can neglect responsibilities (Fig 2.).

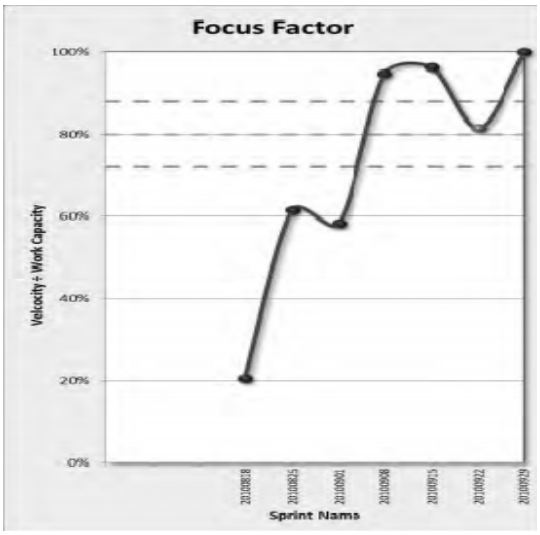

Fig 2. Level of focus in Scrum team [5]

Productivity of agile team entirely depends on human resources. This must be devoted completely. Here is just some guidelines for positive and negative influence. Setting goals to the programmer, providing training, giving periodic feedback on his or her performance improves the individual productivity of programmer [6].

Members must be experts for work in team and must have certain skills which improve productivity [6]:
– Kindness;
– Creativity;
– Dedication;
– Tolerance;
– Initiative;
– Enterprising;
– Communication abilities;
– Optimism.

People who are similar by their nature are not welcome in agile teams because their attitude decreases productivity. People who work at agile

teams must have certain quality and not to give up easily. Changing things in team not only affect productivity, it can also change identity of team. One person can be very important for team in productivity and if he is also motivator and actuator, it can be crucial for success.

Agile team for productivity due to must have cohesiveness. Cohesiveness is increasing with more cooperation in team. Communication is also a measure of productivity. Clear tasks are precondition for productivity.

Some of factor which affect productivity are [6]:

- Identity of the team
- Personnel changes on the team
- Cohesion team
- Communications team
- Clear objectives
- Support for innovation

Innovation increases productivity of agile team in both technology and management. There are some others factors that affect productivity and can be critical in developing teams. Setting goals to the programmer, providing training, giving periodic feedback on his or her performance improves the individual productivity of programmer [6].

Here are a few signs of burnout [7]:

- Excessive overtime; becoming the norm with long term duration;
- Rising mistakes: bugs, poor design choices, and hurried implementations;
- Rising temperatures, increasing levels of team stress and conflict;
- Lack of humor / fun, team is too focused and lost any playfulness;
- Lack of refactoring or quality investments;
- Excessive negotiation (or avoidance) of your Done-Ness, rushing at the ends of Sprints;
- Excessive time-off, high levels of team stress seeping into home
- Not taking time off / not taking or cancelling vacations;
- Increased paranoia; “they” are after us, we have no choice;
- Lack of transparency, honesty, openness, and continuous improvement.

5. FINAL CONSIDERATIONS

In this paper has been shown in which way an agile team works when it is not productive. Unintended consequences should be prevented on time.

Research is show next results [9]:

- Productivity: 68% of respondents reported Scrum is better or much better; 5% reported Scrum is worse or much worse; 27% reported Scrum is about the same.
- Team Morale: 52% of respondents reported Scrum is better or much better; 9% reported Scrum is worse or much worse; 39% reported Scrum is about the same.
- Adaptability: 63% of respondents reported Scrum is better or much better; 4% reported Scrum is worse or much worse; 33% reported Scrum is about the same.
- Accountability: 62% of respondents reported Scrum is better or much better; 6% reported Scrum is worse or much worse; 32% reported Scrum is about the same.
- Collaboration and Cooperation: 81% of respondents reported Scrum is better or much better; 1% reported Scrum is worse or much worse; 18% reported Scrum about the same.

This paper is about principles of agile projects and it presents significance for creating agile development teams. There is a guideline how to develop and implement positive results in team.

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REFERENCES

[1] Goparaju Purna Sudhakara, Ayesha Farooqband Sanghamitra Patnaikc, Measuring productivity of software development teams, Serbian Journal of Management 7, 2012.

[2] Boehm B. W., Software Engineering Economics, Prentice Hall, 1981

[3] Fris, D., Ostergaard, J. and Sutherland J., "Virtual Reality Meets Scrum: How a Senior Team Moved from Management to Leadership," in Hawaii International Conference on Software Systems, Kauai, Hawaii, 2011

[4] Lyssa A. **“**Navigating the Five Levels of Conflict The Agile Way”, Agile Zone, 2010

[5] Downey S. and Sutherland J., Hyper-Productive Metrics, IEEE HICSS 46th Hawaii International Conference on System Sciences, Maui, Hawaii, 2013

[6]Wagner, S. & Ruhe, M., A Structured Review of Productivity Factors in Software Development. Technical Report, Technische Universität München, 2008.

[8] Robert Galen, The Agile project manager can agile teams get “Burned out”?, 2013

[9] Sutherland J. and Schwaber K., The Scrum Papers: Nuts, Bolts, and Origins of an Agile Method. Boston: Scrum, Inc., 2007.