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How Not to Fail Running Personnel Motivating Projects

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***Abstract*—**The number of projects' failures is permanently increasing despite all modern attempts to keep software projects functionality and progress under control. Agile software engineering, dependable software development and many others are targeted to solve those problems in different sectors. At the same time it is not possible without highly skilled and motivated personnel as people drive methodologies and define success of any project. Therefore it is important to develop employees into a team of highly professional, loyal and attached to the organisation people. Unfortunately the software industry is a highly technological sector with a shortness of personnel resources in many countries. Employees are often leaving companies despite all common motivating techniques. The paper discusses establishing special, so called motivating projects to address employees' needs to develop themselves by learning something new that can be challenging for them. The motivating projects have special risks and the article outlines them and proposes some approaches to deal with those proactively.

***Keywords*—** Dependable software, personnel motivating, software engineering, key success factors.

I. Introduction

THE number of software projects failures is increasing from year to year. Those projects' costs are carried by customers either directly or indirectly increasing the cost of developed software sufficiently. A situation with "successful" projects is not much better: only 20% of functionality (in average) is used "often" or "always" and 16% "sometimes". The remaining 64% is either never used or used just occasionally [5]. In recent years, dependability - an integrative concept comprising such criteria and sub-criteria as reliability, security, continuous development, availability, safety [1, 10] - has become to be very important. The increasing competition between software vendors and much more demanding markets force companies to stabilize their productivity and improve their development process in all respects [6]. At the same time it is not possible to develop really dependable, i.e. reliable and highly available software systems without having highly professional and motivated personnel. Unfortunately the software industry is a highly technological sector [11] with a shortness of personnel resources in many countries. Therefore it is important to ensure that company employees will not leave the company. This task is not as easy as it looks like. Professionals are still migrating from one company to another despite all common motivating practices proposed so far [2, 3, 4], like good salaries, friendly working environment etc. It happens mainly because workers are looking for something more challenging or bored to do the same work using the same tools. Therefore, it is important to address such technological needs in addition to common motivating approaches.

The core idea of personnel motivating software development is to establish a special project (or a set of projects) that can motivate the organizational personnel by allowing them to learn something new, use new technologies and practices doing a useful work for a company [7, 9]. Personal motivating projects should be used a preparation step on our way toward developing dependable.

The article concentrates on possible problems in order to find how not to fail running motivational projects. Nearly any road we take is far more complex than it looks like at the start point and any taken road is worse to share knowledge about. The article is based on our recent experiences obtained from such projects.

The paper is organised as follows. The section two describes what personnel motivating projects are, why those are run and how to select participants. The following section reviews common problems, mistakes managers do in motivating projects. Stress, involvement, timing and management support are discussed in sub-chapters. The forth section discusses the practice was obtained managing personnel motivating projects. Here special methods are outlined addressing previously described problems. The last section concludes the paper.

II. Motivating Projects

This chapter provides guidelines on why and how to start motivating projects. This part of work is mostly produced using our previous articles [7, 8, 9] and serves as an already learned material, which is a base for the following study.

A. Reasons to establish

The personnel motivating projects are usually run in the following cases:

1) The organization would like to encourage employees to learn something new that will be useful for the organization in the (near) future providing them with such opportunities within a dedicated project;
2) The developers encourage an organization to move to another methodology/technique etc. demonstrating a list of advantages and the organization is willing to accept

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this migration if those advantages will be shown during a pilot project. This one can also be used to describe proposed personal motivating projects, as a need to keep highly skilled personnel force organisations to establish a project.

It is important to remember that any organization reaches its operational and strategic goals mainly via their employees work. Therefore the motivating project should not be concentrated just on providing benefits for employees, but should be driven by organizational needs (short and long-term).

One of the most valuable reasons for companies in such cases to decide for running motivating projects is a goal to prepare personnel for implementing dependable software, i.e. highly reliable, available and supporting continuous development in the future. Such valuable and important goal requires more than implementing standards, building required infrastructure and involving newest methodologies. It requires highly skilled and motivated personnel.

B. Team

A personnel of any company is not a set of totally identical persons, therefore those can be partitioned by their ability to learn something new into the following groups:

1) Innovating;
2) Slowly changing / slowly learning;
3) Static [7, 8].

It is possible to define two factors that can be used to select team members. Those factors are specific to projects, as the general innovating level of a person doesn't guarantee that s/he like to learn this (project) particular technology. For example some persons like to explore web technologies, while others like to coupe with core elements, algorithms etc.

The learning project factor for a person participating in a project can be calculated by multiplying his/her ability to learn, willingness to learn (deal with) the project technology and organization wish to motivate this particular person.

If somebody is motivated to be in another position then the following factor should be used – re-positioning motivation factor, which is calculated by multiplying a person's potentiality to be in this new position, willingness to deal with this position's problems and making decisions, and the organization wish to learn (motivate) this particular person. This factor is used instead of the learning factor in projects dedicated either to encourage somebody to participate in different activities in compare to his standard activities or to check this person ability to do this another type of work in order to promote him later to this position.

Besides other team selection methods and factors specific for an organization can be used.

III. Common Problems Specific for Motivating Projects

Unfortunately a good project to work on and a good team don't necessarily mean that the project will be successful. There are a lot of other factors affecting the end result and managers tend to forget about those starting the motivating project. Here we will study the second set of key factors that should be addressed in addition to the factors described in the previous chapter.

A. Stress

One common problem that occurs often in the motivating projects is stress that workers do face. There are various reasons of stress occurrence and some (main) of them will be reviewed below. Notice that stress factors can be both indirect and direct, i.e. can be either realised by a worker or latent. Generally saying there is no much difference between those kinds, as the result is approximately the same: decreasing of efficiency and a wish to avoid such projects; although the kind of the factor can be important to address different stress types.

The most often stress factor is an increased responsibility that workers could have in new projects and major reasons of that are:

1) A need to meet expectations of management having a little knowledge about technology to be used.
2) Having a little of own interest to continue that project at least during the starting phase, i.e. been not enthusiastic about it. Notice that a person could become more and more involved into the project the more he knows and even more the more he does in this project.

Another stress factor is a new work environment that is normally formed during the motivation projects. The environment change could consist of either one or several elements:

1) A new work place;
2) A new team;
3) A new software development language or methodology or soft-/hardware etc.;
4) A new manager or/and a customer.

Comment: Notice that under the customer we mean somebody accepting the team work, so it could be both an outside customer and a person within the same organization.

Thereafter the team (and basically each member of that) have to estimate a length of work for different project tasks having no or very short understanding of how it can be done. Here we have experienced different employees self-protecting reactions in this situation:

1) Avoid giving estimations finding reasons of why it cannot be done. Accepting this behaviour by the management will lead to a great uncertainty in the project planning and impossibility to properly plan other works both for this team and for others (like for example – by which date requirements should be ready to allow a team to continue development of other parts);
2) Greatly increasing estimations without real reasons to do that. This could lead to:
   a. Dropping the project as it cost (basing on those

estimations) will be too high;

b. Having gaps in the work-flow if a work is done and no new design/requirements are complete;

c. Resynchronisation with supporting teams as estimations doesn't reflect actual amount of work to be done.

Notice that the common believe that developers will under-estimate the work to be done is quite a rare case.

In conclusion we should notice that a lot of managers doesn't realise that the stress factor exists in motivating projects mostly since everybody are extremely excited about the work to be done starting and during the project. At the same time hidden stresses are hard to control and therefore managers could face very unpleasant surprise when plans are not met after a lot of efforts have been invested into the project.

B. Problem connected to timing, progress and workers abilities

Here we are going to explore problems that are specific to the work progress reviewing main reasons why it is slower that it was initially planned.

First of all it can be connected to new methodology/technique etc to be used. A lot of teams tend to rebuild a product they are working on permanently since the motivating project is always about learning something new. The more they learn the more critically they look at the already done parts and like to rebuild it using freshly obtained knowledge doing the same things twice or more. Of course sometimes rebuilt parts allow completing remaining tasks quicker, but here we should calculate the lost time, as skilled workers will go the last found way straight away. Here occurring problems can be divided into two separate classes. The first progress delays consequence type is increased stress as a person feels to be failing. Moreover management have to move the progress forward so starts to push the worker (sometimes forgetting that it is learning / motivating project!) stressing the learner a lot. Notice that the right estimates (as we mentioned above already) already contains enough extra time to buffer such delays, so the project should be monitored by an optimistic plan, stressing only if the pessimistic (real) one is not met. The second type of consequences is potentially increased lead time between releases. Rare releases cut feedbacks from the team customers (internal and external as it was mentioned before) greatly and therefore produce a feeling that nobody is actually interested in the work the team is doing. Customers become less involved into the work process, start to forget what was discussed during the last release milestone and so forth.

Besides a question of estimating employees' capabilities should also be raised. It is obvious to consider additional time needed to learn new materials, but many managers tend to forget other consequences of the learning process. First of all a lot of new information to work with and remember normally decreases persons' capabilities as people tend to tire much quicker. Besides they have to establish an own learning environment, search for new materials etc. This demands more time, efforts and therefore cuts productivity.

C. Involvement

It is important to stay with the main idea running the motivating project and not to shift into a new technology project. The later occurs quite often, as management tends to forget that it is not just a project started to explore one or another technique, but primarily is established to keep personnel happy together with moving the company forward. Therefore the level of involvement into technological decisions, writing the code etc is very important from the "motivated" people point of view. They should not fill to be forgotten and should have something challenging to work on.

D. Communication channels and habits

Another very important problem lies in the lack of management and organisational support for motivating projects. It is not enough just to run this project and assign people we would like to motivate. It should be carefully grown and looked after otherwise the organization resources are spent improperly and its personnel is not really motivated. The following list brings up the major problems caused by lack of management support:

1) It is obvious (or even directly stated) that the developed product will never be used. As nowadays modern approaches say that the success of any project directly depends on its (commercial) use, the product can be seen as failed right from the start.

o It is hard to work or a project that failed right from the start

o It is hard to make yourself to concentrate on all details implementing a "dead" product.

2) There is no feedback (reviews, accepts) of the work. It makes to think that actually nobody is interested in the product. Consider also the fact that the person to be motivated would like to be motivated not only by doing something challenging, but also would like to be noticed and appreciated;
3) The product will be in use, but no long life is expected. This case can be a problem, if the motivating project is advertise as very important and valuable, challenging etc just to keep a person for the company, i.e. actually over positioned and employees expectation will not match reality later. It is important not to disappoint motivated persons.

If the described problems as a consequence of management support lack will occur then team members will feel themselves deceived.

IV. Addressing Described Problems

This chapter is about to provide some ideas on how to address earlier described problems. Mostly those need to be considered and addressed before the motivating project starts during the planning stage. Below key approaches are

discussed.

First of all skills to be used, developed and motivated within a project should be carefully selected. Theoretically, the wider experiences of employees are the better. Practically this situation often means that too many efforts are spend on skills, which are not used later and learning of them demands too much time. Therefore it is crucial to consider rather a "broad range of kernel (key) skills".

Thereafter it is important to prepare in advance an infrastructure to support motivating projects. It is possible to divide such infrastructure into two main kinds: employing infrastructure and assisting infrastructure. Quite often new technologies, which are to be used, demand much more from hardware, software and communication channels than older technologies. Therefore it is important to consider

1) Do customers ready to accept a new product with those increased requirements;
2) Do the current investments plan supports purchasing new equipment and software that are about to be used in the project (i.e. develop on it).

Although the employing infrastructure issue is critical to start a project, the assisting infrastructure is not less important since it directly ensures success of the project. The assisting infrastructure is an infrastructure that is used during the project to report progress, bugs, provide feedbacks and so forth. Moreover in this new type of projects, that we are considering here, the assisting infrastructure should include parts supporting the learning process. It can be either a special courses management system containing different materials or just software for web based demos and collaboration. The second important role of this infrastructure is to allow monitoring the process showing more than simple tasks' progress indicators.

Here we arrive to another crucial technique ensuring motivating project success – it is important to monitor the project closely. The best way will be to have a specialist of the area/technique to be learned that can be assigned to this task or a manager every team member respects. This is needed to:

1) Avoid spending time improperly by guiding the team into the right direction;
2) Ensure that learning is really moving forward, i.e. accept the progress and ensure that everybody is giving the best;
3) Approve results and produce a report about the motivating project. For example answer – "Is the motivated person able to do the targeted work or he failed";
4) Decrease stress of employees as beginners feel that they are not alone;
5) Approve and/or correct estimates.

Depending on the organisation, there could be a decision to motivate all workers, selected people or selected groups. It is obvious that dependable software building requires having everybody been motivated, updated on newest technology and reliable. From another side there could be obvious restrictions like:

1) Shortage of company resources to organise such special projects. Those clearly demand more attention, are slower and don't guarantee a good outcome in all cases.
2) Only a part of the company team consists of persons that are innovating or able to coupe with newer approaches.

As a result there are two alternatives: either keep the company innovating or cluster projects into different types. The first approach asks to avoid motivating static people hoping they will eventually migrate to other, "better" for them, places. The second approach defines that some projects will be built using modern technologies driven by innovating people and static persons will be kept on back-end projects.

Finally the team motivating issue has one more interesting approach that is successfully used in our practise. It is possible to form a team (set of teams) that will be compiled from highly skilled professionals. Those will be used for very important projects or in case of some-kind crisis. This team is the main object of motivational projects. This approach allows concentrating resources advancing those who are worse to motivate and is simpler than motivating individuals. Moreover the following approach can be proposed having such skilled teams in companies, which would like to develop modern, reliable and secure products, but also have slowly learning individuals: the project can be started (taken over at some moment) by the innovating team in order to transform to newest methodologies and then handed over to a slowly learners team. They will have to move it forward learning, but don't have to invent nor research (immediately) the full range of opportunities of this new technology. Instead, they will have a set of examples inside the already developed code, which they can follow in future. Other advantages of motivating teams rather than individuals are:

1) ability to avoid stress for people of been in a new group, in a new place (together with others) etc. creating a stable environment;
2) ability to employ already functioning communication channels between team members that used to work together for a very long time decreasing communication gaps.
3) each team member knows exactly what others can or cannot do, what to expect from them etc.

If it is not possible to form and motivate stable teams then the management should consider decreasing the number of possible interconnections forming each time into pilot project teams by finding some patterns of professionals that eventually are repeating. The "new" team can be something that historically existed before and therefore is not too stressing any longer.

It is also advisable to have "experts" meetings where current problems are discussed so everybody is aware on open issues (hardest questions) and could contribute with own ideas. It does increase the involvement sufficiently and does challenge team members. The main danger here is a lack of

collaboration and interest. Therefore it is important to encourage people, may be to have informal parties to promote collaboration etc. to ensure freedom of minds and discussions.

Learning meetings should be also conducted to spread the knowledge over the team and allow presenting learned materials. The work is challenging if and only if there is a possibility to share obtained information with others, show yourself and contribute to moving towards the team's common goal. The "learning meetings" is an opposite type of meetings in compare to the open problems discussions meetings, which also contributes very well into resolving the involvement issue.

V. Conclusion

The personnel motivating projects is an important part on the road to adopt dependable software development principles since highly motivated personnel is a key success factor for producing really reliable, secure systems supporting continuous development.

The first step running such projects is to decide whom to include into the team using either the learning project factor or re-positioning motivation factor. Thereafter decide skills important that are important for organisation to develop. It is important to monitor the progress closely and guide the team in order to arrive to the project goal, as the motivation is important, but not the only goal. The project should be both useful for the company as any organisation arrives its goals via individuals work and have the future as nobody likes to participate in a project, which is dead from the start. The team motivation instead of individuals can be a choice to decrease complexity and spent resources in the motivational projects. Challenging work with new technology is the cornerstone idea of motivation. Therefore is important to recognize efforts and let people to collaborate and submit own ideas, i.e. keep members involved. Finally, it important to track stress factor that is normally latent as anybody is enthusiastic about doing something new. The stress has very different sources that are outlined in the paper. Awareness about risk factors and following proposed methods described in this article will allow success of the motivating projects and let focus on the organisational goals on the road of the company evolution.

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