

RETAINING TALENT

AN ATTEMPT TO COPE WITH THE 'CURSE' OF MAINTENANCE PHASE

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ABSTRACT: *This paper discusses the gloomy side of maintenance phase of the software product life cycle. The roots of the problem are traced by investigating the nature of tasks and the state-of-mind of software engineers engaged in maintenance teams. The paper highlights the threats posed by monotonous nature of maintenance tasks and proposes the observations to bring about changes that can help to encounter these threats in the longer run.*

Index Terms -- Retaining Talent, Motivating Software Engineers, Software Maintenance Phase, Human Resource Management, Knowledge Workers.

I. INTRODUCTION

Organizations engaged in the information technology (IT) business are knowledge based firms. The success of these organizations depends upon the skill-set of their employees [1] [2]. Due to supply-demand situations in IT market and a different type of employee-employer relationship, these organizations have to survive in competitive labor market [3]. It raises the need of strategically competing with similar organizations. Part of it depends upon acquiring talented workforce [4,5]. These organizations try to recruit the best talent from the market and need to retain it [6].

IT managers are entrusted with the challenge of retaining this talent in this highly competitive labor market [3]. Retaining knowledge workers depends upon, how effectively their needs are recognized and satisfied [7,8]. The nature of IT projects makes this job more challenging. Once executed, the project undergoes maintenance and closure phases. Already at the maintenance phase the knowledge workers start losing interest and start planning voluntary attrition. Often, organizations with better growth opportunities and more challenging tasks are the destined employers [6,9].

The following sections discuss, why and how does the maintenance phase of software project life cycle affect maintenance engineers? Furthermore, the measures that can be taken by the IT managers to avoid attrition of these knowledge workers are discussed.

In order to understand the problem and reach a concrete conclusion, the answers to following questions shall be found.

- a) *Why should a software organization retain her employees?*
- b) *What makes Software Engineers distinct from other groups of employees and what affects their motivation?*
- c) *What are the characteristics of maintenance phase of software product life cycle?*

II. KNOWLEDGE WORKERS, A CAPITAL ASSET

In this age of knowledge economies, knowledge workers constitute one of the most important factors contributing towards the success and the productivity of organizations [10]. IT firms stand on top of the list among the organizations whose destination is determined by their employees. The software firms, with exceptionally skilled work-force, have a competitive edge over similar business concerns. This

motivates IT organizations, even trying to attract the highly skilled employees of their competitors. It is achieved by offering the prospective employees competitive salaries, better working conditions, better growth opportunities and providing them with better alternatives than what they currently have [3] [7]. Due to high turnover rate and high recruitment and training costs, IT employees are widely treated as a capital asset [4,5] [10]. The knowledge workers add to the technological worth of IT organizations, like all other technical and infrastructural acquisitions of the firms. The only and the biggest difference among these acquisitions is that knowledge workers cannot be purchased and forced to stay in the organization [1]. Leading companies in the market assume better strategies to effectively retain their skilled employees. Retaining quality talent by the organizations is considered a way to get ahead of competitors [7]. The intellectual capital or knowledge workers of an organization have been described as "the total stock of capital or knowledge-based equity that the company possesses" [5] [10,11].

III. SOFTWARE ENGINEERS, A DIFFERENT SPECIE

Software engineers and programmers have been able to develop an identity as a group of professionals that distinguishes them from other groups of professionals [12]. This categorization has largely been performed on the basis of professional needs of groups of employees. Software engineers and programmers are treated as superior breed of employees for possessing skills that are individualized and bring financial gains to IT organizations. They are also deemed to have distinctive professional needs when compared with average employees involved in other organizational activities. Studies have been carried out for uncovering the peculiar characteristics that make them different from other categories of employees [12]. Researchers have identified a number of characterizing attributes of software engineers. The most common of these attributes of software engineers and programmers are listed in Table 1. This table has been compiled basing upon thorough literature reviews by the domain experts [12,15]. As is it obvious many of these characterizing attributes are closely related to the nature of the job. The nature of job, hence, seems to contribute towards shaping the identity of this professional group. Rapid technological changes in the software and computing industry

and the measures needed to stand these changes also contribute towards this distinct characterization. Continuous learning and problem solving form an inherent part of the job of software engineers and programmers. Moreover, in dynamically changing technical markets, software professionals want to keep themselves up-to-date in terms of technology and skills [4,12,13,14].

Listing down the characterizing attributes can help in better understanding the nature, needs and motivational factors of software engineers.

Table 1

Characteristic	Rating
Need for stability (organisational stability)	5
Technically competent	5
Achievement orientated (e.g. seeks promotion)	4
Growth orientated (e.g. challenge, learn new skills)	9
Need for competent supervising (e.g. needs respect and appreciation, given a clear job to do and goals)	4
Introverted (low need for social interaction)	7
Need for involvement in personal goal setting	1
Need for feedback (needs recognition)	2
Need for Geographic stability	1
Need to make a contribution (needs worthwhile/ meaningful job)	3
Autonomous (need for independence)	7
Need for variety	4
Marketable	2
Need for challenge	4
Creative	2
Need to be sociable/identify with group/organisation/supportive relationships	5

IV. ON MOTIVATING SOFTWARE ENGINEERS

The purpose of learning the characteristics of software engineers is to identify the factors that can keep them motivated, committed and loyal to their organizations. In 1961, Johanson and Celement compiled their observations that are considered as a milestone in setting the direction of research around motivation for engineers. They pointed out challenging tasks as the prime factor to keep engineering students motivated. In their study of engineering students they observed that the tasks that tested the nerves and technical skills of the students to an utmost level kept them motivated [16]. Same guidelines apply to software engineering professionals. Software engineers and programmers are highly paid and fiscal luring doesn't work well with motivating them [8,12]. After looking at the characteristics of software engineers, it can be observed that desire for professional growth, autonomy and introversion and need for stability, increased competence and

identity make the top characteristics. These are followed by the need for challenges, need for variety and need for competent supervision.

Software engineers naturally prefer working in the organizations that satisfy their characterizing needs. Organizations that provide them with the opportunity to continuously enhance technical capabilities make preferred employers. Software engineers are keen of undertaking tasks that pose challenge to their technical competence and do not appreciate monotonous assignments.

V. THE CURSE OF MAINTENANCE PHASE

A major part of efforts and resources engaged for a software project are consumed in maintenance activities [17] [18]. But in general, the maintenance teams are considered as less important within IT organizations. The maintenance teams lack receiving the direct attention of management when compared with other teams engaged in software product life cycle [17] [19]. Maintenance activities involve the modification of existing operational software while leaving its primary functions intact [19]. In simple words, bug fixing, enhancing functionality and/or customizing the product to user needs and work settings are included in maintenance activities. These tasks are mainly preventive, perfective, or adaptive in nature and are performed upon existing software applications [20] [21]. These tasks are, however, mostly repetitive in nature, lack innovation and are under-valued. Lack of innovation and challenge and the associated worthlessness makes them less attractive for the core programmers and software engineers. Engaging in these tasks for longer periods de-motivates employees to the levels where they consider attrition as a preferred option [9,18].

Studies show that lack of growth, lack of developmental opportunities, availability of better career opportunities, insufficient compensation, regional salary differences, lack of interesting work, poor leadership, poor relationship with peers and managers, taking employees for granted and mismatch of employee goal with that of organization [7][8] [9]. Keeping in view, the prevailing perception about maintenance phase, major known causes of motivation and de-motivation and the characteristics associated with software professionals, inferences can be drawn. It is apparently, lack of need for extra ordinary competence, lack of challenging nature, lack of growth orientation and lack of variety or monotony of work that makes basis for de-motivation. Author terms this as 'curse of maintenance phase'.

VI. TOWARDS MAKING UP

One of the most important decisions that service managers make is allocating rightly skilled workers to right project at right time or phase in the project [15,22]. Keeping a high performing teams and members engaged in monotonous and repetitive assignment is not a decision that a seasoned manager would make. Keeping in view, the characteristics of software professionals and the menace that the maintenance phase carries, the first step would be to trying chalking out 'the plan' and discussing it with the professionals in the team. In software industry motivation keeps software professionals going. It is the duty of managers for setting the direction of the teams [14]

[22]. It is important to establish a healthy culture across teams. As mentioned earlier development opportunities, sense of accomplishment and independence in job weigh more in terms of motivation than monetary rewards [12,23]. Advancement opportunities, extrinsic rewards, flexible work arrangements, job satisfaction, availability of alternatives, non-work influences and organizational factors such as prestige are recommended to characterize this healthy organizational culture [4]. Path-goal theory provides obvious guidelines in this regard. As Schriesheim and Neider mentioned, "Path-goal leadership theory is basically a "functional" approach to leadership, calling for a diagnosis of functions which need to be fulfilled in subordinates' work environments for them to be motivated, perform at high levels, and be satisfied"[24].

VII. COURSE OF ACTION

Previous sections help us establishing the dimensions of the problem at hand. A 'diagnose and cure' strategy is needed to be chalked out, to cope with the potential threat. In situations when the high performing knowledge workers are exhibiting signs of voluntary attrition, reactions have to be quick. Satisfying the under-addressed needs with challenging tasks and growth opportunities and entrusting them to maintenance teams is immense in such situations. To a great extent, it correlates with the organizational human resource policy and the available resources. The IT managers might come across two situations:

MEDIUM OR LARGE SCALE COMPANY, ABUNDANT RESOURCES

In this case, there is a vivid chance that should be availed. Underneath is a proposed 'what to do' or 'how to react' course of action, that can be followed in such situations.

A. Talk with the higher management and plan

The first step is to raise the alarm to the higher management, get the go-ahead signal and chalk out the strategic plan to cope with the situation.

B. Bring the team onboard

Talk with the team individually and in group to know their explicit needs. Make them realize that the organization cares about them and values their experience and capabilities [20]. However, only realizable commitments should be made and met as well [2].

C. Next Version or New Product?

Engage the de-motivated employees in research assignments and entrust them with the job to figure out what is of more interest to them. Do they think that a new version for current product is needed or they are of the opinion that current product and technology being used is decaying and hence a new product should be launched?

D. Transition of maintenance project

Allocate the maintenance positions to junior or fresh employees and get them trained from the seniors before the project is completely handed over to them.

E. Trainings and refresher courses

Arrange the necessary refresher courses or advanced trainings in the needed technologies to give them this sense of being competitive and compatible with the market.

F. Re-allocation to other projects

In multi product and multi-project environments engage the experienced professionals in challenging positions. This will satisfy their need for achievement and love for challenge. Follow the 'right person for right position' rule.

G. Outsourcing to competitors

If there is no immediate possibility to create an in-house, exciting assignment for the team, outsource your expertise to firms who are in need of this workforce [6]. Many companies hire teams for project tenure. It saves them costs and efforts to raise teams ground-up [1]. This will not only help retaining the valued asset of the company but also bring extra cash.

H. Pro-active approach to coping with future challenges

Maintenance does not have to be necessarily a de-motivating job. Treating maintenance engineers in same fashion as the development engineers in terms of technological trainings, methodologies, autonomy and qualified supervision can keep the bad feelings away.

SMALL COMPANY, LIMITED RESOURCES

In this case, keeping in view our previous findings and discussions, it is perhaps disappointing but obvious that it will be hard to retain the skilled and experienced workforce in high demand markets. The only chance that we have is to outsource our high performance team to a company around the corner that lacks these skills.

VIII. CONCLUSION

Maintenance phase of software product life cycle is cursed with monotonous and de-motivating tasks that negatively affect the performance and loyalty of employees. The implications are devastating in present day competitive market settings. The negative impact can be subdued through contingency plans and drastic measures. However, a proactive approach needs to be followed, to avoid reaching a point where 'reaction' is the only option. This can be achieved through promoting an organizational culture that provides equal professional growth opportunities to our maintenance engineers. Implementing up-to-date modern methodologies in maintenance teams, setting targets and recognizing achievements of our maintenance-engineers at all organizational levels is desired. Treating the maintenance teams as much an asset as development teams can bring about the change that will save us encountering the same problem over and over again.

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The author is an IT and Ubiquitous Computing graduate with more than 12 years of cross border experience in public and private sectors. In his professional life, he has managed teams, designed and monitored projects, and been engaged in software development activities. Currently he is pursuing his master's degree in computer science at Blekinge Institute of Technology, Karlskrona-Sweden.

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