

*Full Length Research Paper*

# Methodology for software development as organizational creativity factor

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**Today, creativity is renamed as a special tool for entrepreneurship, and economical growth is converted to determinant factors in organizations' growth and survival. Successful organizations view the use of creativity as a key element for their production process. This article aims to discuss the relation between production methods in software industry as one of the rich industries and methodology for production software from an organizational creativity point of view. After analyzing the data that were obtained by the questionnaire and interviews conducted with persons in development software team, it was obvious that an easy methodology was used for organizational creativity, and it had drastic differences in team spirit, freedom and risk taken when compared with other methodologies.**

**Key words:** Creativity, methodology of software production, factors and barriers for creativity, leadership, organizational culture.

## INTRODUCTION

Companies will be successful in a new economy that satisfies customers' needs as a continuum and more beyond it. Some of these explanations need existing elements for creativity and innovation for human forces. Organizations will lack partial development process without continuum care.

Creativity is very important from the individual and organizational point of view and by religion thinkers. Krishna (1991) in his book for young people was of the opinion that prejudice and fanaticism have negative effects on personal creativity, and considered passive mitigation as a factor for closing mind.

Creativity is seen to be very important between groups and organizations. Today, innovation and entrepreneurship consider it as the basis for growth and economical development regardless of severe economical crises and saturation in consumable markets (Fusari, 1996).

Innovation is a special tool for entrepreneurs. It is easy to learn and is considered as a clear method for documentary (Drucker, 1984). This situation acts as market for innovation, causes more extension of management and in other words, increases knowledge management in organizations and is very important. Knowledge management is to collect and integrate processes that are involved in production, distribution and use of knowledge in the administration of affective management (Gurteen, 1998). Knowledge management is used to supervise the collection of pragmatics, structure, technology and organizational operation that offer creativity and values for staff. In this process, for implicit organizational knowledge, we have to make use of individual structures for growth attitude, though it seems that knowledge management is not for special organization and all parts pertaining to knowledge (Gartner, 2008). All researches carried out on relative maturity are determinant researches in the field of organizational art, but after investigations, we displayed that this research is based only upon contents and supervisor on original elements; as such, we tried to discuss how to relate software production with motivated situations and determine organizational creativity.

In this research, we used sampling and distribution questionnaire for statistical discussion, while for analysis

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**Abbreviations:** RUP, Rational unified process; IBM, International Business Machine.

**Table 1.** Innovation steps in TRIZ.

S/N	Step
1	Small restoration in the technical system by applying knowledge in making the same system
2	Dissolve technical contrasts with multi technical systems pertaining to the same system
3	Dissolve physical contrasts by knowledge of various systems
4	Offer new technologies that need to be encapsulated in various fields of science
5	Discover new material or phenomenon that needs innovation and creativity

of data, we used interview with managers and directors of projects.

### Creativity

Creativity has many definitions, for example, Herbert Fox believed that: creativity is the thinking process that solves problems in a suitable and helpful way (Rezaeeyan and Mosavai, 2008).

A comprehensive definition of creativity was offered by Kaiser (1967) who recognized creativity as applying mind abilities for making mind or new concept. We concluded that creativity has no frontier and will be applied in any manner. This popularity did not cause similarity, as shown in Table 1. In creativity engineering (TRIZ), it is believed that innovation is supervised on 5 steps that will depend on environmental, resources, physical contrasts and innovator situation (Mansourian, 2007).

As pointed earlier, organizational situation considers creativity variants in organization. Accordingly, there was no definition about organizational creativity, but before paying attention to these definitions, variants, observations and studies were performed in organizations. Organizational creativity was defined as production, services, idea or methodology that is acted by many persons in social systems. This definition will integrate important creativity particularizes like freshness and valuables in social systems (Woodman et al., 1993). Work situation that can cause creativity are (Andriopolous, 1996):

1) Organization atmosphere: Based on research in HP firm, if organizational atmosphere consist of deliberation, freedom for decision and expressing of raw ideas, it suffices for creativity (Feurer et al., 1993).

2) Leadership: If there is partnership between leadership and internal satisfaction, it increases creativity, and if an organization has a responsible leader, there will be direct partnership between staff and personnel with good efficacy, personal interests and shared aims, thereby emerging in creativity (Locke and Kirkpatrick, 1995). Also, a manager will direct financial resources and technological resources for innovation of all staff.

3) Organizational culture: Based on its definition, it is shared as the deepest assumptions that are edited by managers (Locke and Kirckpatric, 1995). If culture is

based on learning and innovation that will direct creativity in organization, risk taken, confidence and partnership will be considered as creativity particularizes in organizational culture (Amabile, 1988).

4) Sources and skills: We cannot ignore the role of creativity in organizational innovation, it is necessary to attract creative persons in organizations to compete in the labor market. Subsequently, organization takes two valuable sources like time and money for emerging creativity (Amabile, 1988).

5) Organizational structure: For directing management and emerging creativity, it is necessary to transmit information in social and environmental system to reach experts, thus, organizational creativity needs to structure every person to use maximum information and its formality is to reduce creativity; therefore, we see little formality in another section (Brand, 1998).

As for organizational situation, it seems that the use of parameters and conditions in the field of research and functions is to discuss various methods to determine creativity placement based on needs and requirements.

### AN OVERVIEW OF THE METHODOLOGY FOR SOFTWARE PRODUCTION

This methodology is based on process, lines, guidelines, official techniques and document paradigms, and relations that are used in all steps (Dobrica and Nimela, 2002). Generally, this methodology is classified into three sections namely: agile methodologies, rational unified process, and rich methodology.

The agile methods that are known are systems with structured analysis, whereas design methods are based on views in software engineering (SSADM, version 4.3 structural standards). Viewing from this perspective, this process is seen as serial and non-referral in all steps like production, analysis, programming and system. This method is hardly used today because of phasing more risks when used, and it is suitable for small systems. The usage is more rapid in application of development that is more concentrated on time and little respect in programming and documentation (McConnell, 1996). In this method, collection and keeping of data have more importance, but little attention should be paid to their behavioral particularizes that speed the formation and

**Table 2.** Variance of parameters.

Non biased interview	Team spirit	Ease place	confidence	Support of ideas	Think advantage	Freedom act	Risk taking	Publicizing and organizational view	Total
0.416	0.168	0.633	0.376	0.316	0.362	0.109	0.186	0.379	9.454

increase in the use of this method simultaneously.

Rational unified process (RUP) (2003) methodology is the more extensive and official method for software production that depend on nature project. This method was invented by International Business Machine (IBM) Company and used for many projects. Supplementary programming and phasing have advantages and its formality is that, if there is need for words or statements to be analyzed, we can use them directly in text. In this method, the roles are specified and are directly accessible in RUP documents. New methodology invented after RUP is not used in reducing formality and complex rules in all projects, reducing numbers and simplifying roles of horizontal extending roles and reduces management levels and flexibility in the process is more emphasized. In this methodology, rules are pragmatic, for example, attention was paid in one day version software's or in Extreme programming methodology; it is advised that programmers sit on desk of computer as two persons to perform operation simultaneously and perform two ideas (Mcbreen, 2003). These three methods have many differences in important organizational parameters like: scale of team, scale of formality and selection depends on package and kind of project. In this article, effective use of them on organizational creativity is considered as necessary creativity in development of software.

### Problem

In every field of organizational creativity and methodology for software production, many researches were conducted and their relations were subsequently reviewed.

The factors affecting organizational creativity are dividend in mental, cognition, experimental and social factors (Mayer, 1999). In every field, a progressive list can be provided, for example, organizational growth located in two classes. Growth by increasing knowledge and assumptions in organization supports creativity, but in other words, when the organization developed, scale of beliefs increases and this subject influences organization creativity negatively (Borghini, 2005). Linguistic specifications and flexibility of mind are personal parameters on organizational creativity (Mednick, 1962).

Creativity resources are not limited to personal researches and Peter Drucker in a book, "Innovation and

Entrepreneurship", presented two valuable resources: process requirements and structural needs. These two resources have bases for non-personal bases and count in organizational creativity, based on its combination with definitions and motivators (Andriopolous, 1996).

In order to relatively do away with methodologies that attract forces and form software, it seems that selection of one method do not have effect on team performance. Certainly, it is possible that some engineers are members of teams only, and this subject has little importance than organizational parameters used as a methodology of software production in determining the dominant atmosphere in organizations. Its definition can be achieved by effective factors in organizational creativity and performance with 9 particularizes (Isaksen et al., 2000):

- 1) Participation of staff in public and organizational view.
- 2) Perform reasonable and instructive risks.
- 3) Freedom of staff to collect data, make decision and perform.
- 4) Think of advantage before performing.
- 5) Produce and offer new ideas.
- 6) Mutual confidence in workplace.
- 7) Ease in workplace and freedom of spending time by staff.
- 8) Having team spirit in work and solving problems.
- 9) Non-biased interview culture without red line.

The research question is, which technology can particularly increase this and provide organizations terms for creativity? And are there meaningful differences between various methodologies? These questions are in terms of dissolving problems based on content and application for research results.

### METHODOLOGY

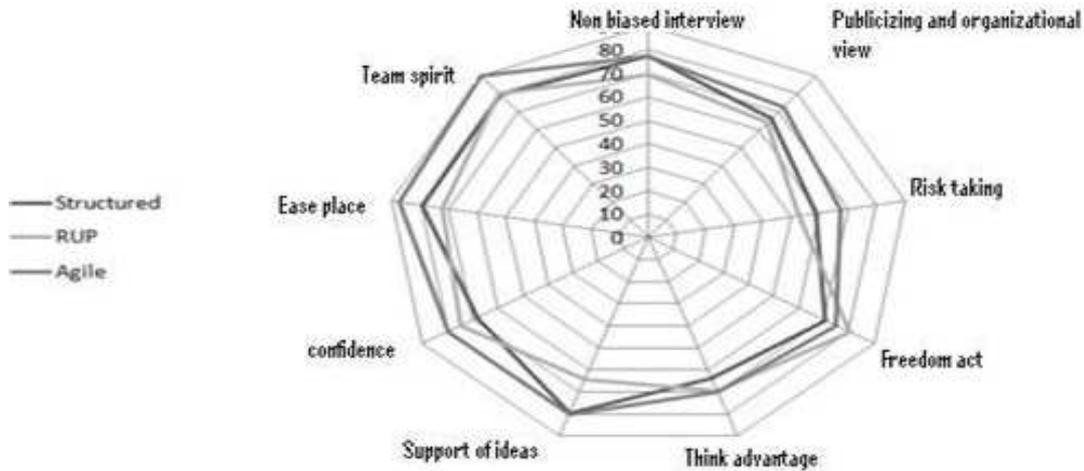
As effective variants on organizational creativity, a creative climate questionnaire (Isaksen, 2000) was used in this research. Alpha calculations and its adaptability are offered in Table 3.

Based on the results of Table 2, Krombach alpha is 0/786 and it shows good adaptability. The said questionnaire was randomly distributed between staffs of 15 software firms, and the sampling was performed randomly.

Between staff and company sampling, the companies' database in Tehran showed that 30 questionnaires were completed by software roles like: analyzer, architect and designer, programmer,

**Table 1.** Variance test.

Factor	Team spirit			Freedom act			Risk taking		
	Structured	RUP	Agile	Structured	RUP	Agile	Structured	RUP	Agile
Average	3.18	3.22	3.6	2.82	3.22	3	2.36	2.11	2.7
F	3.47			3.36			4.59		
Group	Agile , (RUP , Structured)			RUP , Agile , Structured			Agile , (Structured , RUP)		



**Figure 1.** Comparison particularizes of organizational creativity in various methods.

agent for test and debugging, manager project, and support and assembly.

For better analyses, results from all respondents were examined. Out of 30 samplings, 3 managers' projects were recognized and an interview was performed with them. Analysis was obtained in another section.

**ANALYSIS**

In this study, average adjectives and analysis of variance were used for analyzing the data obtained. The data were taken from three societies: users of agile methodologies recorded 11 followers, RUP methodology recorded 9 followers, and XP methods recorded 10 followers.

Based on the results of Table 3, variance analysis was conducted for every adjective in various societies like: team spirit, freedom and take risk, and drastic difference (with 95% confidence).

Certainly, there is drastic difference between adjectives and other adjectives supporting ideas that do not confirm the ideas of the interviews conducted, and we can count them. We offered variance test as well as how to group them consequently.

It is observed that agile methodologies have to do with all cases instead of thinking and freedom, and it provides better situations for creativity; its aim is to determine suitable organizational conditions and its effect on

creativity.

As said earlier, creativity happened in an environment with more data (Walton, 2003), and this subject needs to ease partnership environment and strong inter relations that determine reduction of formality and increase team spirit of particularizes for agile methods. Complexity and rich nature occupation, relative autonomy and control support are necessities for organizational creativity (Oldham and Cummings, 1996). Agile methodologies are integrated in the role of designer, analyzer and programmer to attract rich occupations. The groups are confronted with thinking problem, but if respected in public agreement, possible solutions are discussed and group values are obtained in them (Luthans, 2003). As of interviews with managers, it is conferred that group thinking has many importance in agile methods and this subject is caused to obtain rapid decision in these teams. Finally, a comparative graph of all methodologies is shown in Figure 1.

**CONCLUSION AND SUGGESTIONS**

The different researches conducted in organizational creativity posed a question: Does software production methods provide a suitable ground for organizational creativity?

In order to answer this question, we investigated group and organizational parameters involved in creativity and made use of a questionnaire in statistical society for software engineers in Tehran companies.

Results obtained from agile methods have few formalities and they inspire better team spirit, freedom and risk taken. In other words, we witnessed low freedom and thinking in software production team.

RUP methodology has clear steps working for all software and it is necessarily suitable for use with high efficacy. If we use this methodology, for example, we will observe that persons do not follow new dangers because RUP methodology has the lowest occurrence of risk between software production methods.

One of the particularizes of this study is based on contents; though creativity is counted as a prominent tool for entrepreneurship, until now, no research has been conducted about more contents. It is necessary to discuss organizational creativity. The cultural factors that cause creativity are in contrast with persons and ideas that cause creativity if they are not extreme (Tadbir Journal, 2003).

Discussion of this factor is necessary to perfect methods and carry out a deep analysis between organizations, pertaining to individual staff particularizes; however, the effect of standard methods will form a good field for future researches upon contrasts.

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