People Management in Agile Development

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Keywords: Agile Development, People Management, People in Agile.

Abstract: The People Management (PM) is a fundamental part of managing software projects in perspective of the development process dependent on the people they perform. The methods are focused on people and their interactions in order to maximize the success of software projects. However, most projects still suffer from unsuccessful risks. Given the importance of PM and its complexity, this work aims to build a PM model for software development approaches. A Systematic Review of Literature (SRL) was carried out in order to gather data about the state of the art in agile development. From the data collected in the SRL was proposed the PM model. The proposed model was generically constructed to serve as a guide in PM in agile projects, independent of the characteristics of the organization and the time it is implemented.

1 INTRODUCTION

An essential part of software project management is People Management (PM), since the Software Development Process (SDP) depends on the skills, motivation and interaction of people throughout the project. And that without good management the outcome of the project is, in general, inadequate (Sommerville, 2010) (Pressman, 2005).

The agile manifest brings in its scope the valuation of individuals and interactions to the detriment of processes and tools, and in its principles it indicates that people related to businesses and developers must work together and daily, throughout the course of the project (Beck et al., 2001).

PM in works of a non-manual nature, as Software Engineering (SE) is characterized, faces at least two major problems. A reference to the effectiveness of the work done - Doing the right things. And the other one of efficiency - Doing things right (Drucker, 1995).

Considering the complexity and importance of PM in the SDP, especially in agile methodologies, this work intends to analyze the academic production in this area in order to investigate how PM is made, which Human Aspects (HA) are desirable in a team and which HAs are investigated in this context. And with that create a People Management Model (PMM) for agile development and verify its applicability.

The remainder of the paper is organized as follows. Section 2 presents the Background in which the theoretical bases for conducting this research are raised. Section 3 - Research Methodology - describing the methodology used. Section 4 describes the main results of the mapping study, by characterizing the research contributions in the field. Section 5: People Management Model - in which the proposed model is presented. We conclude the paper presenting some final remarks in Section 6.

2 BACKGROUND

2.1 People in Software Development

The SDP is the set of activities that leads to the production of a software product. The activities of this process, like all creative and intellectual activity, are complex and depend on human judgment (Sommerville, 2010).

SDP is done by people for people. Software engineering is knowledge intensive and includes HA in all phases: requirements acquisition, design, construction, testing, deployment, maintenance, and project management (John et al., 2005).

Human Aspects (HA) decisively interfere in the success of a development project, project management can not be limited to technical factors (Crawford

et al., 2012).

SDP is people-based where their work is complex, intellectual and creative in nature. The success of a software project is linked to the HA involved in development, therefore PM is of great relevance in software projects.

2.2 People Management

PM can be understood as the new trends that are emerging in the Human Resources Management of organizations. For the author, PM is an approach that envisions people involved in an organization as human beings and endowed with intellectual abilities (Chiavenato, 2008).

The practice of the PM presupposes the management of the organization together with the employees. This requires a new view of people, contrary to the classic view that employees are only an organizational resource, servile object and passive subjects in the productive process. It is necessary to see that the employees of the organization are active, decision-makers and innovators (Chiavenato, 2008).

2.2.1 Purpose of People Management

People can increase and reduce the strengths and weaknesses of an organization depending on how they are handled (Chiavenato, 2008).

The objectives of the PM are varied. A good PM should contribute to organizational effectiveness through such things as: Helping the organization achieve its objectives and accomplish its mission; Providing competitiveness to the organization; Provide well-trained and well-motivated people to the organization; Increase self-actualization and people satisfaction at work; Develop and raise the quality of life at work; Managing and driving change; Maintain ethical policies and socially responsible behavior; And build the best team and the best company.

The PM must see to it that the organization and people relate so that everyone's goals are met, governed by a paradigm where everyone wins, not where one wins to the detriment of the other. Figure 1 illustrates the organizational and individual objectives involved in PM.

Contrary to the classical view, in PM individual interests are not seen in opposition to organizational goals. In PM the individual and organizational goals must be achieved together. For this people play central role in PM.

Figure 1: Individual and Organizational Goals.

2.2.2 The People Management Processes

PM consists of several activities. PM policies and practices can be summarized in six basic processes:

- **People Aggregate Processes:** used to include new people in the company. They include recruitment and selection of people.

- **People Applying Processes:** used to design the activities that people will perform in the company, guide and monitor their performance. They include organizational design and job design, job analysis and job description, people orientation and performance appraisal.

- **Rewarding People Processes:** used to encourage people and meet their individual needs. They include rewards, compensation and benefits, and social services.

- **Processes of Developing People:** used to enable the professional and personal development of employees. They involve training, knowledge management and skills management, corporate learning, career development programs, and other activities.

- **Processes of Keeping People:** used to create satisfactory environmental and psychological conditions for people's activities. They include administration of organizational culture, climate, discipline, hygiene, safety and quality of life and maintenance of union relations.

- **Processes of Monitoring People:** used to monitor and control people's activities and verify results. They include database and management information systems.

All PM processes are equally important and act in communication with each other, Figure 2 illustrates the inputs and outputs of PM processes.

The purpose of PM processes is to systematize the organization's behavior in relation to internal and external influences, given the desired results to both the organization and the people involved.
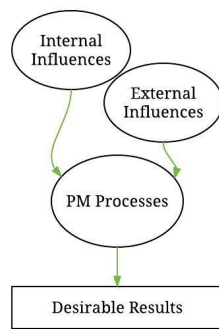
Figure 2: Inputs and outputs of PM Processes.

2.2.3 Responsibility of Personnel Managers

PM is a non-delegable responsibility of every executive or leader within an organization.

The leader must manage people, make decisions about them, understand individual and group goals, set performance standards, engage employees in the organization, take care of appropriate training, and pay and incentives, providing subordinates with conditions contribute to the organization (Chiavenato, 2008).

2.3 Management of People in Software Development

According to Pressman (Pressman, 2005) effective software development management focuses on: **People, Product, Process and Project**. Since this order was not defined by it arbitrarily. According to the author "The manager who forgets that the work of the software engineer consists of human effort will never succeed in project management."

For (Sommerville, 2010) people are the largest assets of a software organization. They represent intellectual capital and it is the responsibility of software managers to ensure that the organization gets the best return on investment in people. In addition, the author indicates that improper people management is one of the most significant contributions to a project's failure.

2.3.1 Practices and People Management Processes

PM in SPD involves multiple processes, with diverse activities and practices. It includes planning roles and responsibilities of those involved in the project, selecting people, assigning tasks, training and maintaining groups, as well as controlling environmental and cultural factors in the project, as well as monitoring team motivation and effectiveness and efficiency of the work performed.

Among the tasks for the PM are (Sommerville, 2010):

- Select the project team;
- Motivate the project team;
- Manage working groups;
- Compose groups;
- Keep cohesive groups;
- Maintain good communication between group members;
- Organize group members;
- Provides a good working environment.

For the Project Management Body of Knowledge (PMBOK) Guide to PM, treated as a Human Resource Management Project, including processes: **Organize the project team; Managing a project team; Guide the project team** (Guide, 2012).

PMBOK maps Project Human Resource Management into four processes:

- **Human Resource Management Plan:** to identify and document project roles, responsibilities, required skills, reporting relationships; To create a staffing management plan.

- **Acquire Project Team:** to confirm human resource availability and obtaining the necessary team to complete project activities.

- **Develop Project Team:** to improve competencies, team member interaction, and overall team environment to enhance project performance.

- **Manage Project Team:** to track team member performance, providing feedback, resolving issues, and managing changes to optimize project performance.

The People-CMM defines as practices for PM in software, among them stand out: The management of the team formation; Communication management; Managing the work environment; Team performance management; Team training; Compensation; Competency analysis; Career development; The development of the working group; And the development of team culture (Curtis et al., 2002).

2.4 Agile Software Development Methodologies

Agile software development methodologies are a set of methodologies that follow the values and principles outlined by the agile manifest (Beck, 2004).

The agile manifest proposes to value: individuals and interactions rather than processes and tools (Beck et al., 2001).

2.4.1 SCRUM

Scrum is an agile methodology for managing and planning software projects. A framework within which people can address and solve complex and adaptive problems (Alexandros et al., 2017).

This methodology is light, simple to understand, but extremely difficult to master (Schwaber, 2016).

The guide by Schwaber, Ken and Sutherland (Schwaber, 2016) describes the three pillars to be adopted by the Scrum methodology: Transparency; inspection; And adaptation. To make these living pillars the values of commitment, courage, focus, transparency and respect are assumed and experienced by the team. Team members should learn and explore these values as they work with Scrum. Success in using Scrum depends on people's engagement in experiencing these values (Schwaber, 2016).

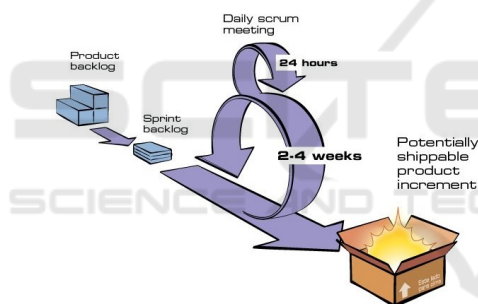The Scrum development process is shown in Figure 3.

Figure 3: Scrum Development Process (Ozkan and Kucuk, 2016).

In Scrum, the functionality to be implemented in a project is maintained in the Product Backlog. The development process occurs iteratively, each iteration is called Sprint and has 2 to 4 weeks. At each Sprint, a Sprint Planning Meeting is held, a planning meeting where the Product Owner prioritizes the Product Backlog items, and the Development Team separates the activities that it will be able to implement during the Sprint that begins. The tasks selected for Sprint are transferred from the Product Backlog to the Sprint Backlog. In addition, each day the Development Team holds a brief meeting to align the team members' knowledge of the work being done. At the end of a Sprint, the team performs a Sprint Review, where the implemented features are presented. Finally, a Sprint Retrospective is done where the team evaluates what has been done and plans the future Sprint (Schwaber, 2016).

2.4.2 eXtreme Programming - XP

XP is the most widely used approach to agile development (Pressman, 2005), being a software development method based on the synergy between simple practices, and its basic values, principles and activities.

The values of XP are: **communication, simplicity, feedback and courage** (Layman et al., 2004).

The basics of XP are: **fast feedback; presumed simplicity; incremental changes; acceptance of change and high quality** (Layman et al., 2004).

In addition to the fundamental principles, XP development follows other principles, some of them are: small initial investment, concrete experimentation, concrete communication, working for the instincts of the staff, acceptance of responsibilities and use of genuine metrics.

Management in XP must take into account four variables: **cost, time, quality and scope**. The process of development of XP is structured in basic activity, they are: **code, test, hear and design**.

Someone needs to have a bigger view of the project and be able to influence it when they leave the course, this is the manager's job, which should also highlight what needs to be done, without delegating who will do it. Management should be based on the confidence that the team members are willing to do the best job, helping to make the result even better (Beck, 2004).

3 RESEARCH METHODOLOGY

This research aimed to map the state of the art of PM in software development and to establish a People Management Model (PMM) for agile methodologies of software development in view of the information collected. With this purpose, the SRL was used of a widely diffused and formally structured scientific methodology.

The SRL conducted in this work had as reference the work of (Munzlinger et al., 2012) and (Keele, 2007), which describe the use of systematic reviews in software engineering. Thus, the SRL occurred in three sequential steps as shown in Figure 4.

Each stage is composed of well-defined goals and tasks.

In the **first stage** the planning of the SRL is done, being necessary: To identify the necessity of the revision; specify research questions; develop the SRL protocol; and validate protocol.

In the **second stage** the review is performed, considering the planning done in the previous step. The
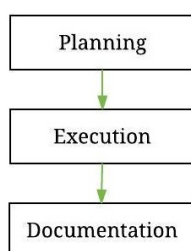
Figure 4: SRL Flow Chart.

activities related to this phase are: select the primary studies; define the inclusion and exclusion criteria of the studies; perform data extraction and analysis; and present the results.

In the **third and final step**, the documentation of the results obtained in the planning and execution is done as well as an evaluation of the means of dissemination of the knowledge generated in the SRL. The topics part of it: specify dissemination mechanisms, formulate reports, and validate the generated reports.

3.1 Research Questions from the Systematic Review of Literature

Considering the objective of the work, this SRL was conducted with the purpose of answering three research questions:

- **(Research Question - RQ.1)** – How is people management accomplished in the agile software development process?

- **(Research Question - RQ.2)** – What human aspects, according to the literature, are desirable for an agile development team?

- **(Research Question - RQ.3)** – What variables, referring to human aspects, are observed in the management of people in agile software development?

3.2 Search Strategy

The SRL was performed with two strategies of searching for primary studies, one automatic and one manual.

3.2.1 Auto Search

The automatic search process was based on the selection of scientific bases, which were applied search strings. The following scientific bases were consulted:

- ACM Digital Library – https://www.acm.org/;

- IEEE Explore – http://ieeexplore.ieee.org/;

- Scopus – https://www.scopus.com;

- Science Direct – http://www.sciencedirect.com/.

The selection of the bases to be researched followed two criteria:

Relevance of the Base: as a parameter of relevance, the list of scientific bases proposed by (Shull et al., 2007), considered as relevant sources in software engineering;

Availability of Access: it were excluded the scientific bases that did not have access available from the university where the research took place.

To filter the publications, according to the purpose of this SRL, the scientific bases were searched, search strings in Portuguese and English.

The strings used were:

Portuguese: ("Gestão de Pessoas" and "Desenvolvimento de Software") or ("Aspectos Humanos" and "´gil");

English: (People Management and Software Development) or (Human Aspects and Agile).

3.2.2 Manual Search

The manual search process was based on the selection of important conferences and journals in the area of agile software development. All publications were considered for title reading, due to the impossibility of applying a search string.

The following conferences were selected for the manual search:

- ACM Conference on Computer Supported Cooperative Work & Social Computing;

- Hawaii International Conference on System Sciences;

- ICSE - International Conference on Software Engineering.

- The periodicals: IEEE Software, Journal of Systems and Software.

The conferences and periodicals were selected based on two criteria: the relevance of the conference or periodical - the QUALIS classification of Capes was taken as a parameter of relevance and the subject addressed by conferences and periodicals (CAPES, 2017).

3.2.3 Selection Criteria

The selection of the studies analyzed by the SRL was based on the research questions raised, for which the inclusion and exclusion criteria were defined and applied.

SRL publications were included that met at least one of the following criteria:

- **(Inclusion Criterion 1 - IC.1).** Publication that deals with the management of people in the process of agile software development;

- **(Inclusion Criterion 2 - IC.2).** Publication that deals with desirable human aspects for an agile team;

- **(Inclusion Criteria 3 - IC.3).** Publication that deals with metrics referring to human aspects used in agile software development.

Publications that fall under one of the following criteria were excluded from the SRL:

- **(Exclusion Criteria 1 - EC.1).** Article that is not written in English or Portuguese;

- **(Exclusion Criteria 2 - EC.2).** Publication is not a scientific article, it is an incomplete Articles or Short Paper;

- **(Exclusion Criteria 3 - EC.3).** Articles repeated in more than one search base;

- **(Exclusion Criteria 4 - CE.4).** Publication that is not a primary study.

The process of applying the criteria followed two steps, in the first one the titles, abstracts and key words of all the publications were read, being made a pre-selection of the works to be targets of the SRL. In the second step a complete reading of the article was made, as shown in Figure 5.
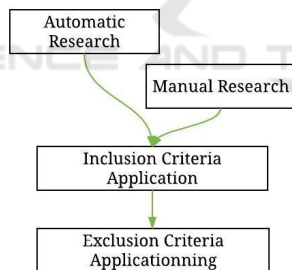

Figure 5: Procedure for Applying the Criteria.

4 SYSTEMATIC REVIEW OF LITERATURE RESULTS

4.1 Automatic Research

The automatic search was performed from the application of the search strings in the databases, as defined in the methodology. This search considered all publications prior to June 15, 2017.

The search string in Portuguese did not filter any publications and in English it filtered 116 publications in the scientific bases. The distribution of publications by base is presented in Table 1.

Table 1: Publications Filtered at the Bases.

Scientific Base	Publications	Percentage
Scopus	54	46.6%
IEEE	44	37.9%
ACM	14	12.1%
Science Direct	4	3.4%

All the filtered publications have gone through the process of inclusion and exclusion defined in this work. In the evaluation process of the papers found, titles, abstracts and keywords were read from each of the **116 selected primary papers**. From this reading the selection was made according to the inclusion criteria adopted.

Six publications were selected, which met at least one of the inclusion criteria and did not fit any of the exclusion criteria.

Ninety-one publications were excluded from the SRL, excluded because they did not meet any inclusion criteria. The remaining **19 scientific papers** were excluded for the following reasons: 11 Excluded by criterion EC.2; 6 Excluded by criterion EC.3; and 2 Excluded by criterion EC.4.

The six publications selected for the SRL are presented in Table 2.

Table 2: Selected Publications in the Automatic Search search.

ID	Publication	Inclusion Criteria
#1	(Höfner and Mani, 2012)	IC.1 IC.3
#2	(França et al., 2013)	IC.3
#3	(da Silva et al., 2011)	IC.1 IC.3
#4	(Hasnain et al., 2013)	IC.1 IC.2 IC.3
#5	(Licorish et al., 2009)	IC.1 IC.2 IC.3
#6	(França et al., 2012)	IC.3

The Table **ID column 2** will be used to refer to the publications in the remainder of this article.

4.2 Manual Research

Publications of the last ten years of the conferences and periodicals selected for this stage have been reviewed.

All the reviewed publications had at least their title read, those that dealt with subjects potentially relevant to this work also had their summaries read, passing

through the same selection criteria applied to the publications of the automatic search. From this process **six articles** were selected, and are presented in the Table 3.

Table 3: Selected Publications in Manual Search.

ID	Publication	Inclusion Criteria
#7	(Chikersal et al., 2017)	IC.1 IC.3
#8	(Cheng et al., 2017)	IC.3
#9	(Bozan, 2017)	IC.3
#10	(Conboy et al., 2011)	IC.2 IC.3
#11	(Umarji and Shull, 2009)	IC.1
#12	(Verner et al., 2014)	IC.1 IC.3

The Table **ID column 3** will be used to refer to the publications in the remainder of this article.

4.3 Scope of Study

Through the search mechanisms and defined inclusion and exclusion criteria it was possible to **select a total of 12 publications**. In Table 4 the periods in which these studies were carried out and the locations where they occurred were presented.

Table 4: Extension of the Study.

Publication	Year	Country
#1	2012	India
#2	2013	Brazil
#3	2011	Brazil
#4	2013	United Kingdom
#5	2009	New Zealand
#6	2012	Brazil
#7	2017	USA
#8	2017	China
#9	2017	USA
#10	2011	Ireland
#11	2009	USA
#12	2014	United Kingdom

Studies were selected from 2009 to 2017 in 7 countries, the research reached a wide temporal and territorial scope.

4.4 Data Extracted from Selected Publications

Data were extracted from the selected articles referring to the three research questions of the SRL.

4.4.1 (RQ.1) How is People Management Done in the Software Development Process?

From the selected articles, #1, #3, #4, #5, #6, #7, #11 and #12 dealt with themes that answer this research question.

Publication #1 presents an approach to people management adopted at an offshore development center of a multinational software development organization.

Publications #3 and **#5** addressed the process of building development teams and **publication #7** exposes the concept of collective intelligence and investigates how the composition of the team can interfere with that intelligence.

Publication #4 investigates the impact of communication on trust among team members in agile software development. The **publications #6** and **#12** map the factors that affect the motivation of software engineers and the impact of motivation on the results of the development project.

The **publication #11** addresses the difficulty of measuring the performance of developers in software projects and points out good practices to deal with these difficulties.

4.4.2 (RQ.2) What Human Aspects, According to the Literature, are Desirable for an Agile Team?

Of the selected articles, the **#4, #5 and #10** have addressed themes that answer this research question.

The **publication #4** points to the ability to communicate as a determining human aspect to the success of an agile software development project.

Publication #5 makes a more elaborate study of this research question and cites qualities and weaknesses that are admissible according to roles to be exercised in the organization. In addition, **publication #5** highlights the importance of agile software development have a diverse set of skills.

Publication #10 conducted multiple case studies with 17 agile organizations. In these studies, people-related challenges were identified, including recruitment, training, motivation, and performance evaluation. The study lists key issues with people in agile development processes. In addition to identifying the problems, the article brings a series recommendations to deal with these problems.

4.4.3 (RQ.3) Which Variables, Referring to Human Aspects, are Observed in the Management of People in Agile Software Development?

All the articles selected dealt with at least one human aspect in MP in the context of software development, except for only **publication #11** which deals only with the measurement of human aspects but does not address any specific aspect. The Table 5 lists all the aspects treated in the analyzed publications.

Table 5: Human Aspects Observed in Management of People.

Aspect	Publications
Personality	#3, #5, #7, #9, #10
Motivation	#2, #6, #10, #12
Productivity	#2, #3, #7
Satisfaction	#1, #7
Confidence	#4, #8
Technical Profile	#3, #10
Behavior	#3
Innovation	#1
Engagement	#1
Collaboration	#9
Stability	#6
Effort	#6
Professional Growth	#6
Collective Intelligence	#7

Personality, motivation, productivity, satisfaction, confidence and technical profile have appeared in more than one publication. **Personality**, the aspect that most appeared, was investigated in **five studies**; then motivation in four and productivity in three publications; satisfaction, confidence and technical profile appear in two publications. The other aspects appear only in one of the publications.

4.4.4 Considerations Regarding SRL Results

The Table 6 presents an overview of the results of the SLR.

Of the **twelve publications selected**, seven addressed research question 1 (RQ.1).

The MP process in the software industry was dealt with extensively by **publication #1**, which presented a MP approach adopted by a company in the area. In addition, this study demonstrates the positive results of this approach. With this in view, the MP model to be created in this paper should be based on the approach presented by this study.

The team building process, part of the MP process, is explored by **publication #3 and #5** while **#7** investigates how team composition impacts collective team intelligence and is therefore a factor that should interfere in the team composition process. The results of these studies demonstrate the importance of the MP team selection process in software development projects, so they should serve as input for the modeling of this process in the MP model to be proposed.

Publication #4 addresses communication in agile software development and suggests that communication opportunities should be incorporated and valued in development processes.

Publications #6 and #7 investigate aspects that affect team motivation and the impact of motivation on project outcomes.

The SRL provided a significant clarification regarding this research question, especially regarding the process of team formation. Regarding other MP processes she was able to exemplify how they occur in the software industry, since only one of the selected studies dealt extensively with MP. The other selected studies allowed the understanding of specific aspects that interfere in MP.

Three of the selected papers dealt with subjects related to research question 2 (RQ.2).

Publication #4 only points to the ability to communicate as a fundamental human aspect for agile team members. **Publication #5** makes a more detailed survey of this issue and suggests a number of desirable aspects according to the roles played by individuals.

And **publication #10** sought to map the main issues with people in the agile development processes and also raises a series of suggestions to help solve those problems. These results may guide PM as to desirable human aspects in an agile team.

By its broadest character, eleven of the twelve publications contributed to research question 3 (RQ.3).

In **total 14 human aspects** are observed in the selected studies, six of them are addressed by more than one study. The most studied aspect was **personality, followed by motivation and productivity**. **Satisfaction, confidence and technical profile** have also appeared in more than one publication.

In some of these publications it is detailed how aspects are measured in the MP process, as previously described.

5 PEOPLE MANAGEMENT MODEL

In view of the results of the SRL and the theoretical reference, a model of people management for agile development based on the published literature and good practices was proposed.

Table 6: Synthesis of SRL results.

Research Question	Aspect Investigated	Publication
RQ.1	MP Approach.	#1
	Team building process.	#3, #5 and #7
	Impact of communication on trust.	#4
	Motivation of software developers.	#6 and #12
RQ.2	Communication capacity.	#4
	Qualities and Weaknesses according to the role played.	#5
	Problems with people in agile development processes.	#10
RQ.3	Personality	#3, #5, #7, #9 and #10
	Motivation	#2, #6, #10 and #12
	Productivity	#2, #3 and #7
	Satisfaction	#1 and #7
	Confidence	#4 and #8
	Technical Profile	#3 and #10
	Behavior	#3
	Innovation	#1
	Engagement	#1
	Collaboration	#9
	Stability	#6
	Effort	#6
	Professional growth	#6
	Collective Intelligence	#7
	Fear	#10

The model was constructed containing three steps. The built-in model steps are shown in Figure 6.
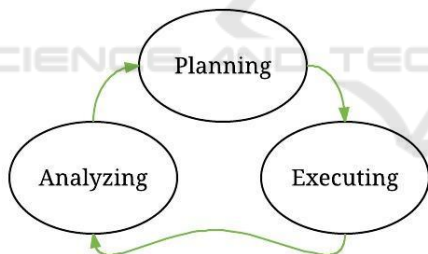

Figure 6: People Management Model.

The management of people was modeled in an iterative way, considering the presence of this characteristic in agile development projects, so that PM occurs concomitantly to the development process. The three stages of the model were created to achieve specific objectives in the PM:

- **Planning:** understand the context in which PM will occur.

- **Executing:** perform activity of the development process in view of PM.

- **Analysing:** ensure continuous improvement to PM.

5.1 Planning

Planning should be carried out in view of PM's objectives. It should be noted that these objectives should not be focused only on organizational goals, but also on the personal goals of the organization's employees (Chiavenato, 2008).

The planning stage is composed of the following procedures: identify the organizational objectives to be met by the PM, identify the personal objectives to be met by the PM, define which PM mechanisms will be used and define how PM results will be measured.

The implementation of these procedures will be done in view of the agile development process. They should be done in the initial phases of projects and reviewed at each iteration of the development process adopted. The following tasks, not limited to them, may be used to carry out the procedures of this step: meetings with the organization's management, meetings with development team, and application of questionnaires.

Everyone interested in the MP of the organization should be involved in the activities of this stage, being responsible for conducting those tasks some collaborator defined by the organization, being able to be a specialized team in the MP or a member of the development team.

5.2 Execution

The execution phase of MP is responsible for the management of the development process based on the resolutions taken in the planning stage. At this stage, it should be understood that MP processes must ensure that internal and external influences can be controlled so that the expected results are achieved.

The execution stage is composed of two procedures: apply defined PM mechanisms and gauge PM results. These procedures should be done throughout the development process.

The following tasks, not limited to them, can be adopted to carry out the procedures of this step: manage culture of the organization; manage employees' careers; manage work content; manage employee compensation; manage the hiring of new employees; manage the application collaborators in productive activities; manage the professional and personal development of employees; monitor employee results; and to apply MP measurement mechanisms.

Those responsible for carrying out these tasks are first and foremost the leaders of the development teams. However, in view of the self-managed character of the agile team, the whole team must share responsibility for the execution of the tasks. If the organization has specialized MP staff, this team should control bureaucratic issues and assist in managing people, not taking full responsibility for the area.

5.3 Analysis

The analysis step should be used to rethink the PM from the results achieved. The procedures of this step are: analyze the results of PM measurements, consolidate good PM practices and suggest improvements to PM.

In order to carry out these procedures, some tasks can be performed, such as meetings with the direction of the organization and meetings with the development team.

As in the planning stage, all stakeholders of the organization's PM should be involved in the activities of this stage, with responsibility for the performance of these tasks by a collaborator defined by the organization.

5.4 Preliminary Validation of the People Management Model

With the objective of evaluating the proposed people management model, we conducted a survey in a questionnaire format, which was composed of 14 questions classified as follows: **First group:** 3 open questions – characterized by the profile of respondents; **Second group:** 9 objectives questions – addressed the personal objectives of those involved in PM; **Third group:** 2 descriptive questions – addressed the personal goals of those involved in the PM in a generic way.

A survey is not just the instrument (the questionnaire or checklist) for gathering information. It is a comprehensive research method for collecting information to describe, compare or explain knowledge, attitudes and behavior. The purpose of a survey is to produce statistics, that is, quantitative or numerical descriptions of some aspects of the study population. The main way of collecting information is by asking questions; their answers constitute the data to be analyzed. Generally information is to be collected from only a fraction of the population, that is a sample, rather than from every member of the population (Kitchenham and Pfleeger, 2008).

The participants of the survey worked on the modernization of two systems of the Brazilian Army (BA), namely: System of Endowment of Military Employment Material (SISDOT) and System of Bulletins (SISBOL). SISDOT is responsible for keeping all materials used by BA, such as Cantil, rifle, machine gun, fuel, cars, etc. SISBOL is a Web application developed to automate the process of making bulletins and generating the personal history of the members of the Military Organization.

5.4.1 Analysis of Results

In relation to the personal objective, the questionnaire questions were constructed in assertive form of respondent satisfaction in relation to a particular personal objective, so that the concordant answers lead to the understanding that the respondent is reaching the personal objective in analysis. Thus, three of the personal goals are not being met by more than half of the survey participants, described below:

1. Satisfactory extra salary benefits (for example: food ticket, transportation voucher, health plan, etc.);

2. Stability in employment;

3. Opportunities for growth (promotion, training, etc.).

The other objectives are being achieved by more than half of the participants, described below:

1. Satisfactory salary income;

2. Quality of life at work;

3. Freedom to work;

4. Leadership with the team;

5. Pride of the work done;

6. Proud of the organization in which you work.

Of these objectives, only Objectives 5 and 6 obtained more than 40% responses totally in accordance with the statement, in other words, that the objective was being achieved in a totally satisfactory way.

This result leads us to the understanding that PM applied in the organization has failures in the search of the personal objectives of its collaborators.

In relation to People Management and Organizational Objectives, 5 responses were obtained from professionals linked to the PM or project managers of the organization. The participants affirmed that the PM is done in a decentralized way and by a specialized professional. In addition, the PM is made according to the norms, standards, programs and defined processes.

In relation to the hiring of personnel the allocation of people occurs according to the availability of the employees. The organization provides means to train people when there is a need for specific technical skills to perform a given activity.

Regarding aspects related to employee evaluation, the participants mentioned that the evaluation of server performance is precarious, since it is practically performed for career promotion purposes and not as a way to improve performance in their activities.

Regarding the role of the human resources team in the PM, the team responsible for human resources acts as Bussines Patner where it accompanies daily all the managers of the organization in their decision-making.

All participants in the survey answered affirmatively that the processes of people management are well defined by the organization, and there are processes that formalize the personnel management procedures, such as:

- Personnel Training Process;
- Process for Benefits;
- Payroll process;
- Performance Evaluation Process – (although precarious, only for the purpose of promoting).

In relation to how the people recruitment, selection and integration in the projects developed in the organization is done, the selection is made through a public tender. The distribution of tasks and the people performance evaluation in the work is done in a hierarchical way, where the immediate bosses delegate the tasks to the subordinates. The performance evaluation is performed annually by the immediate supervisor, the bosses are evaluated by their subordinates. The evaluation process is automated and performed by the peers and the immediate superior.

6 CONCLUSIONS

This research aimed to model how people management should be done in agile software development projects. For this it was necessary to understand how the literature deals with people in the Software Development Process, how management of people should occur in such processes and what specific agile methodologies are relevant to management of people.

In addition, it became necessary to know:

1. How is the management of people in the process of software development?

2. What human aspects, according to the literature, are desirable for an agile team?

3. What variables, referring to human aspects, are observed in the management of people in agile software development?

To answer these questions, an SRL was conducted. Following this methodology, it was possible to find important contributions published in this field of research. Some people management examples have been found, a number of human aspects have been raised as important for a while and one can see which are most educated in management of people (PM) for agile development.

With the data collected, a simple and generic PM model was proposed. That combines the basis of the literature in the area with the good practices observed in the studies analyzed. This model was made with the intention of being easy to understand, adaptive to several methodologies of software development and inexpensive in its implementation.

As a future study, we intend to validate the model with its application in real scenarios in the software industry. And extension of the systematic review of literature extension, gathering more subsidies to improve the proposed model.

ACKNOWLEDGMENTS

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