



# Model for Analysis of Personality Traits in Support of Team Recommendation

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**Abstract.** Among the applications of Affective Computing, some studies are focused on the identification of personality traits. Personality is a factor that can influence the development of a person or a team. In this context, analyzing the specificities of project teams, it was observed the need to support their training based on personality traits. Nevertheless, the literature of the area establishes some recommendation systems based on the principles of similarity. Thus, this research proposes a personality trait analysis model to support the development of project team recommendation systems based on the principles of complementarity. With the literature review, it was possible to make an association of the project teams characteristics with personality traits. From this association, a model was proposed for the evaluation of the personality traits, which was applied to a group of people, from different areas of activity, but who are characterized as potential members of project teams. After verifying the applicability of this model, some guidelines were proposed for a recommendation system of project teams, considering the complementarity of the profiles.

**Keywords:** Affective Computing · Personality traits · Recommendation systems · Project teams

## 1 Introduction

Affective Computing is a constantly expanding area that investigates how computers can recognize, model and respond to human emotions and how they can express them through a computer interface (Picard 1997). Among the applications of Affective Computing, some studies are focused on the identification of personality traits.

Personality is a factor that can influence the development of a person or how a team interacts. Taxonomies of personality have aided in understanding of the role of personality in a wide variety of domains (O'Neill and Steel 2017).

Tracing personality helps in the psychological differentiation of individuals, but it is a very complex activity. For Nunes and Cazella (2011) personality is not only a superficial and physical appearance of an individual, for although it is relatively stable and predictable, it is not necessarily rigid and immutable.

Bejanaro (2005) states that depending on the quality with which members are able to integrate with one another the overall performance improves. A team composed of only leaders can hinder their progress, given the insubordination characteristic that all members can present (Belbin 2010b). Boehm (1981) also states that a team must complement itself in every way, in terms of skills, profiles and goals.

Some works that use the identification of the personality traits applied to the recommendation systems in different contexts, either for customer loyalty systems (Nunes and Cazella 2011), for the recommendation of work teams (Nunes 2012), for identify personality traits with Social Media content (Gao et al. 2013), or to investigate the relationships between personality traits and motivational preferences for gamification (Yuan et al. 2016).

Some researchers have also focused on the application of personality traits in people recommendation systems.

What is observed in the proposed recommendation systems is that they are based on the principles of similarity, homogeneity and attraction. In this perspective, Nass and Lee (2000) consider that people usually prefer to interact with others who have a personality similar to their own.

Thus, analyzing the specificities of project teams, it was observed the need to offer a support system for team formation based on the complementarity of personality traits. So, this research is characterized as an exploratory research that aims to combine and adapt some models of personality traits analysis seeking to support the development of recommendation systems of project teams based on the principles of complementarity.

To achieve these objectives, the methodological steps were: (i) identification of the ideal characteristics to forming project teams; (ii) combination, adaptation and proposition of a personality traits test model with focus on the relevant team characteristics; (iii) application of this model to a group of people; (iv) proposing guidelines for team recommendation systems based on complementarity of profiles.

## 2 Personality Traits

The affective computation, according to Costa et al. (2015), presents two areas of research: “one that studies the synthesis of emotions in machines, when one wants to insert human emotions in machines; and the other investigates recognizing human emotions or expressing emotions through machines in human-computer interaction.”

The focus of this research is on the second perspective, which seeks to recognize human emotions from a person's personality. Nunes (2012) considers that the psychological aspects, such as emotion and personality, are important and influence the decision-making process and that the emotion suffers great influence from personality.

There are different approaches to defining personality, one of which is the personality traits approach, which allows us to use measurable and conceptually traits to differentiate people psychologically (Nunes and Cazella 2011).

Some models are proposed to describe and identify personality structure. One of the most widespread models within psychometrical personality traits theory is the Big Five Personality Factor Model, known as Big Five, being empirically developed by leading researchers: Lewis Goldberg, Robert R. McCrae and Paul T. Costa, Jerry Wiggins and Oliver John (John and Srivastava 1999).

Barroso et al. (2017) points out that the Big Five is one of the most accepted and used models to identify the psychological characteristics related to the personality. Hutz et al. (1998) defines the Big Five model as a modern version of Trait Theory due to its conceptual and empirical advancement in the field of personality.

The characteristics of each of the five factors of the Big Five model are described by Berger (2015), as:

- Extroversion: quantity and intensity of interactions, higher level of sociability, loquacity and assertiveness;
- Agreeableness: it refers to the capacity to be useful, cooperative, generous and relaxed towards others;
- Conscience: refers to responsibility, organization and discipline;
- Neuroticism: characterizes the degree of emotional stability, impulse control and anxiety;
- Openness: it concerns high intellectual curiosity, creativity and openness to new experiences.

The trait approach is considered the best way to represent personality in computers, and questionnaires, also known as personality inventory, are commonly used by psychologists (Nunes 2012). Some of the most commonly used Big Five personality traits analysis inventories are:

- 240-item NEO-PI-R (Revised NEO (Neuroticism-Extroversion-Openness) Personality Inventory) (McCrae and John 1992);
- 300-item NEO-IPIP (Neuroticism-Extroversion-Openness) International Personality Item Pool (Johnson 2000);
- 100-item FFPI (Five Factor Personality Inventory) (Henricks et al. 2002);
- 132-item BFQ (Big Five Questionnaire) (Barbaranelli and Caprara 2002);
- 120-item SIFFM (Structured Interview for the Five Factor Model) (Trull and Widiger 2002).
- 136-items NPQ and 60-items FF-NPQ (Nonverbal Personality Questionnaire and Five Factor Nonverbal Personality Questionnaire) (Paunonen e Ashton 2002);
- 504-items GPI (Global Personality Inventory) (Schimit et al. 2002).

Nunes (2008) hypothesized that the number of items influences the accuracy of the measured traits, thus, the higher the number of items, the greater the accuracy of traces extracted. However, no studies have been found to confirm this hypothesis.

The authors DeRaad and Perugini (2002) affirm that GPI is the largest inventory to measure Personality Traits, however, its disadvantage is the large number of items that compose it.

NEO-PI-R is an inventory that contains 240 items categorized in 30 facets, 6 for each dimension of the Big Five, thus having a fine description of a person's personality traits (Nunes 2008). The author further states that NEO-PI-R is used commercially, so its items are protected by copyright, so it can not be used freely by scientists. Johnson (2005) developed the NEO-IPIP inventory, containing 300 items with 6 facets for each dimension of the Big Five, totaling 30 facets, thus being similar to the NEO-PI-R, but free of charge.

### 3 Project Teams

In teamwork each person contributes with his or her own ability to reach a common goal. Luecke (2010) defines a team as a small number of people who complement each other with different skills in order to perform a task. Bejanaro (2005) states that the performance of a team depends on the quality members are able to integrate with one another, since each person brings a different personality and experience that will affect all the team, thus, the team's formation must be influenced by the way these personalities and experiences articulate.

Thamhain (1988) states that efficient teams have some characteristics that are associated with skills of the members and their interaction with the team, being: Ability to solve conflicts; Good communication; Good team spirit; Mutual trust; Self-development of team members; Effective organizational interface; High need for achievement and growth.

In addition to the characteristics of team members, Thamhain (1988) also points out some characteristics that are directly related to project performance, restricting tasks and results: Commitment to technical success; On schedule, on budget performance; Commitment to producing high quality results; Innovation and creativity; Flexibility and willingness to change; Ability to predict trends.

According to Belbin (2010b), the structure of the teams must take into account the personality of the individual, since a team made only of leaders does not progress, it is believed that there will certainly be conflict among the members, because of this. The author states that an ideal team should be developed so that the strengths and weaknesses of each member complement each other.

Belbin (2010a) states that in order to form good teams meticulous selection is necessary, as well as having an adequate number of candidates offering specific abilities and characteristics in order to seek a combination of these skills and personalities. Not attending to these criteria is the singular reason teams fail. Belbin (2010a) also describes nine "Team Roles" or preferential roles that were developed based on the individual behavioral patterns of members of a successful team:

- **Plant:** These are innovative and creative people who come up with new ideas and approaches. Tend to be highly creative and good at solving problems in unconventional ways. They thrive on praise but criticism is especially hard for them to deal with. They may also be poor communicators and may tend to ignore provided parameters and constraints;

- Resource Investigator: These are good at exploring opportunities and bringing resources to the team, improving the development of ideas;
- Monitor Evaluator: People with a high critical aptitude and good at examining all aspects of a situation. Provide a logical eye, making impartial judgements where required and assess the team's options in a dispassionate way;
- Co-ordinator: These are people who have an ability to get others to work on shared goals. Needed to focus on the team's objectives, draw out team members and delegate work appropriately;
- Shaper: These are highly motivated and energetic people, have a need for achievement. Provide the necessary drive to ensure that team members keep moving and do not lose focus or momentum;
- Implementer: These are practical people, have great self-control and discipline. They perform tasks systematically. Needed to plan a workable strategy and carry it out as efficiently as possible;
- Teamworker: These are people who are sociable and interested in others, flexible, perceptive and diplomatic. They do not like conflict and do everything to avoid it. They help the team using their versatility to identify needs and address them on behalf of the team;
- Completer Finisher: These are typically introverted people, as they prefer to work by themselves, but their standards are high and they have a great interest in accuracy and reliability. Most effective at the end of tasks for polishing and scrutinizing the product, subjecting it to the highest standards of quality control;
- Specialist: These are dedicated people who are proud of their technical skill and knowledge. They like to reach a high professional standard. They bring to the team in-depth knowledge of a key area.

Team Roles argues that balancing roles in a team improves the possibilities of cooperative work by creating synergy and balance between the strengths and weaknesses essential to each individual role (Santos and Santos 2017).

## 4 Recommendation Systems

Recommendation Systems are defined by Ricci (2011) as software tools and techniques that provide suggestions of items that can be useful to the user, such as products, music, news, among others. In addition to these applications, the recommendation systems can be used for the recommendation of people, supporting the decision making in several areas of knowledge.

Cazella et al. (2010) explain that one of the greatest challenges of the referral systems is the right combination of user expectation and the products, services and/or people that will be recommended. According to Cazella and Reategui (2005), the recommendation systems can be classified into three approaches types: (i) content-based filtering, recommendations depends on users former choices, in which information from items seen in the past is used to recommend new items; (ii) collaborative filtering, which uses information from people who have common interests; and (iii) hybrid filtering, is a combination of more than one filtering approach so that the failures presented by each method are minimized.

For Al-Shamri and Al-Ashwal (2013) the most important recommendation system is the “collaborative recommender system which recommends people with similar tastes and preferences in the past to a given active user.”

A recommendation system was proposed by Nunes (2012), also called Group Recommender, which allows “recommending work teams considering the characteristics of the tutor and the similarity of Personality Traits of their students” in E-learning courses. The author explains that it is necessary to divide the students into subgroups, at which point the proposed system helps in decision making, recommending students with a similar personality to their tutor.

The majority of existing approaches to recommender systems focus on the similarity of the characteristics, which for project teams would not be the most recommended. So, in this research, the measure of similarity will not be used, since the objective is to support the formation of teams with profiles that complement each other, seeking to improve their performance.

### 5 Model for Analysis of Traits Personality in Support of the Recommendation of Project Teams

From literature review and research presented by Thamhain (1988); Boehm (1981); Belbin (2010a) and Bejanaro (2005) it was possible to relate the characteristics of project teams with the facets proposed in the Big Five model (Table 1).

This research aimed to identify the emotional characteristics of team formation, focused on the complementarity of profiles. However, among the characteristics listed in the literature review there are some technical characteristics that are not the focus of this study at this moment, but which are also characterized as important aspects for the next step of recommending teams project. Some of these technical characteristics are: Self-development, Commitment to budget and Quality (Thamhain 1988); Commitment to the technical part and Technical skill (Belbin 2010a).

As can be seen in Table 1, there are several features that authors recommend for an ideal design team. For each of these features was inferred a dimension and one or more facets of the Big Five model.

**Table 1.** Association of team features to the Big Five model

Author/features of project teams	Big Five	Facet
(Thamhain 1988); (Boehm 1981) and (Belbin 2010a, 2010b)	Good communication	Extroversion Sociable
	Innovation and creativity	Openness Imagination
(Thamhain 1988) and (Belbin 2010a, 2010b)	Ability to resolve conflicts	Socialization Altruism/Cooperation
	Mutual trust	Achievement Reliable
	Capability of achievement	Achievement Practical

(continued)

**Table 1.** (continued)

Author/features of project teams	Big Five	Facet	
(Boehm 1981) and (Belbin 2010a, 2010b)	Extroversion	Extroversion	Sociable/Enthusiastic/Energetic
	Intelligence	Openness	Intelligent
	Orderliness	Achievement	Orderliness
	Critical posture	Socialization	Critical
(Boehm 1981)	Optimistic posture	Socialization	Optimistic
(Belbin 2010a, 2010b)	Detail posture	Achievement	Meticulous
	Introversion	Extroversion	!Sociable!/Enthusiastic/ !Energetic
	Enthusiasm	Extroversion	Enthusiastic
	Sympathy	Socialization	Nice
	Stable	Neuroticism	!Unstable
	Assertiveness	Extroversion	Assertiveness
	Efficient	Achievement	Efficient

Some facets are denied using a “!” before your name so that you reach the desired result. As an example, the facet !Unstable, from its negation it is possible to obtain the characteristic Stable.

Associating the characteristics of design teams with the facets presented on Big Five model it was possible to elaborate the questionnaire to evaluate the personality traits test. The questionnaire is presented in Table 2.

**Table 2.** Questions for the personality test

Facets	Questions
Altruism/cooperation	I make people feel welcome; I like to help others; !I am indifferent to the feelings of others; !I turn my back on the others
Cooperation	I am easy to please; I can not stand confrontations; !I scream with people; !I avenge of the others
Sociable	I talk to many different people at parties; I like to be part of a group; !I prefer to be alone; !I avoid crowds
Enthusiastic	Irradio joy; Express children’s joy; I look at the positive side of life; !I rarely play
Energetic	I do a lot in my free time; I can manage many things at the same time; !I like a calm lifestyle; !React slowly
Confident	I believe that others have good intentions; I trust what people say; !I believe that most people are essentially evil; !I distrust people
Trustworthy	!I dive into things without thinking; I do things according to a plan; I am careful with others; I do not see the consequences of things
Efficient	Complete tasks successfully; I excel in what I do; Handles tasks smoothly; !I have little to contribute

(continued)

**Table 2.** (continued)

Facets	Questions
Thorough	Thorough I avoid mistakes; I choose my words carefully; !I act without thinking; !I often make last minute plans
Organized	I love organization and regularity; !I often forget to put things in their proper place; !I leave my room messy; !I do not mess with people who are messy
Imagination	I love to daydream; I get carried away by my fantasies; Spending time reflecting on things; !I have a hard time imagining things
Intelligent	I like to solve complex problems; I have a rich vocabulary; !I have difficulty understanding abstract ideas; !I am not interested in theoretical discussions
Practical	I'm going straight to the goal; I transform plans into actions; I demand quality; !I only do the work necessary to survive
Sympathy	I appreciate the cooperation above the competition; I suffer the pains of others; !I'm not interested in others; !I can not stand weak people
Unstable	Usually as too much; I do things that I regret later; !I easily resist temptations;! I've never spent more than I can afford
Assertive	I like to lead others; I try to influence others; !I hope others will tell me the way; !I do not like to draw attention to myself
Optimistic	In uncertain times, I usually expect the best;!If anything can be done for me, it will give; !I almost never expect things to go my way; !I rarely count on good things happening to me
Critical	!I do not like rules and regulations; I take to make decisions; !I'm insecure; !I can easily adapt to new cultures

After analysis of the facets that would be relevant to the work, 64 questions were selected, 4 for each facet. However, there were no questions that assessed two important facets: Critical and Optimistic. For filling this gap, four questions were also listed for each of these facets, and they were developed from Snyder and Lopes (2002); Naranjo (2001) and Belbin (2010a) research. Thus, the questionnaire had 72 questions.

The questionnaire was based on Nunes (2008), Snyder and Lopez (2002); Naranjo (2001) and Belbin (2010a). As already mentioned in Sect. 2, the NEO-IPIP questionnaire (Johnson 2005) was composed of 300 questions, separated by dimensions and facets. In this way, it was possible to select only the necessary questions to evaluate the facets reported in Table 1.

### 5.1 Application of the Proposed Model

The personality trait test model was applied to 30 participants with different profiles: students, teachers and professionals from different areas.

The questionnaire was made available through the JotForm online form, in this way, the respondents had access to a link that directed to the questionnaire and at the end the results were sent via the Web.



For each question the following alternatives, based on the work of Pimentel (2008), were presented: I totally disagree; I disagree; Neither agree nor disagree; I agree; I totally agree. The alternatives had a weight from 0 to 4, following its sequence, which is related to the coherence relation with the facet: 0-Strongly disagree; 1-Disagree; 2-Neither agree nor disagree; 3-Agree; 4-Agree totally.

In the case of facets with Denial, such as Stable, obtained from the negation of the Unstable, the weights were inverted. After answering the questionnaire, the percentage of each facet for each participant was calculated.

The highest score per facet is 16 points (in the case of greater affinity with the facet) and the lowest is zero (in the case of no affinity with the facet), since for each facet 4 questions are presented.

In order to obtain the results, the points obtained in each facet were added, to then transform these points into a percentage. Table 3 presents the facet results for 3 of the 25 participants. Participant 1, for example, in the Altruistic facet, obtained a sum of 10 points, equivalent to 62.5% affinity with such facet.

**Table 3.** Partial result of the analysis of personality traits

Facets	Participant 1	Participant 2	Participant 3
Altruism	62,50%	43,75%	56,25%
Cooperation	87,50%	37,50%	43,75%
Sociable	43,75%	56,25%	62,50%
Enthusiastic	81,25%	75,00%	37,50%
Energetic	50,00%	43,75%	62,50%
Confiable	58,33%	58,33%	58,33%
Eficient	50,00%	56,25%	62,50%
Detailed	68,75%	62,50%	68,75%
Organized	62,50%	87,50%	56,25%
Creative	68,75%	50,00%	37,50%
Intelligent	81,25%	37,50%	37,50%
Practical	56,25%	68,75%	75,00%
Nice	68,75%	50,00%	43,75%
Stable	62,50%	68,75%	56,25%
Assertive	50,00%	62,50%	56,25%
Optimistic	87,50%	68,75%	62,50%
Critical	56,25%	37,50%	43,75%
Trustworthy	66,67%	41,67%	41,67%

Each participant has a percentage of affinity with each facet. At this study, we consider that as higher the percentage, as greater its affinity.

With the results obtained for each participant, the facets will be used, from their combinations, to infer the relevant characteristics to support the work in project teams, as it is possible to see in Table 4, with the result for 3 participants. Recalling that the relationships between facets and characteristics have already been presented in Table 1.

In Table 4, the results are also presented in percentage for all inferred characteristics. In this way, it was also considered that the higher the percentage, the more affinity the participant has with it. For the characteristics that needed more than one facet an average was made between them. Those that were related to only one facet maintained their percentage.

**Table 4.** Result of the features of 3 participants

Features	Participant 1	Participant 2	Participant 3
Ability to resolve conflicts	75,00%	40,63%	50,00%
Good communication	43,75%	56,25%	62,50%
Mutual trust	62,50%	50,00%	50,00%
Innovation and creativity	68,75%	50,00%	37,50%
Intelligence	81,25%	37,50%	37,50%
Organization	62,50%	87,50%	56,25%
Critical posture	56,25%	37,50%	43,75%
Optimism	87,50%	68,75%	62,50%
Detail	68,75%	62,50%	68,75%
Introversión	41,67%	41,67%	45,83%
Enthusiasm	81,25%	75,00%	37,50%
Practical	56,25%	68,75%	75,00%
Sympathy	68,75%	50,00%	43,75%
Stability	62,50%	68,75%	56,25%
Assertiveness	50,00%	62,50%	56,25%
Efficiency	50,00%	56,25%	62,50%
Extroversion	58,33%	58,33%	54,17%

Analyzing these results, it is possible to observe that each individual, according to his or her most outstanding characteristics, can complement the profile of a team with his or her own personality. In this sense Nunes (2012) states that according to structural theories, it is the personality traits that lead individuals to seek, interpret and then react to life events in a proper way.

Thus, it is understood that personality can greatly influence the way a team develops, as confirmed by theorist Murray (1938, apud Nunes 2012), “personality would function as an organizing agent, whose functions would be to integrate conflicts and limitations to which the individual is exposed, to satisfy their needs and to make plans for the achievement of future goals.” From the presented characteristics it is possible to infer the profile of each participant using the “Team Roles” from Belbin. Thus, the guidelines for a recommendation system, which, based on the Big Five facets, list the characteristics and profiles denoted by Belbin (2010a).

## 5.2 Guidelines for Project Team Recommendation System

In face of several existing recommendation systems which assist in recommending people, products or services based on similarity, guidelines are proposed for a recommendation system that will form project teams using, in addition to the technical profile of their members, their personality traits, in order to compose a team with different and complementary personalities.

In this way, from the personality traits, it is possible to infer the characteristics and, finally, to compose the profiles for a project team.

Belbin (2010a) presents nine (9) important profiles in a project team, only one (1) focused on their technical training, the other eight (8) focused on the personality of the individual. Keen (2003) explains that among the eight (8) profiles based on the personality proposed by Belbin (2010a), there are four (4) profiles that are essential for a quality team, being: Coordinator; Plant; Monitor Evaluator and Implementer. Thus, a proposed guideline for the recommendation system is for the team to have these 4 profiles in their composition.

Each profile has some specific characteristics that are important in a project team. As an example, an Implementer profile, according to the works of Belbin (2010a) Bejanaro (2005) and Boehm (1981), should present the following characteristics: Practical, Organized, Efficient and Stable.

There are two characteristics that all profiles need to have: (i) Mutual Trust, since all team members must have a certain trust between them, and (ii) Intelligence, as everyone must have a certain level of intelligence to help the team. However, there are some profiles, such as the Plant and Coordinator, which stand out because they have a high level of these two characteristics.

The Optimistic characteristic proposed by Boehm (1981), is not part of the profiles proposed by Belbin, however, it was inserted to add to the Completer Finisher profile, since these characteristics can balance a team with respect to the vision of the problems faced by the group. It is worth emphasizing that the balance of these profiles is important. The excess of pessimism may discourage the team and the excess of optimism may imply in critical vision lack.

So, another guideline would be to infer the profile of each team member. For this, it is necessary that their characteristics are listed, and from there to perform a mean of the characteristics that compose the profile. With the proposed calculation it is possible to associate the profile of each person, an example is demonstrated in Table 5.

The recommendation system could demonstrate to the manager the profile with which each member has a greater affinity, contributing to the composition of the team.

Although the recommendation considers the personality traits of its members, technical training is also important. In this way, a recommendation system of project teams should:

- Relate the technical information of the members, according to the professional training and proficiency profiles required for the project;
- Match competency profiles with personality traits that can be complementary to an effective team.

**Table 5.** Affinity for each profile

Participant X	Affinity
Sower	65,97%
Implementer	57,81%
Monitor	54,16%
Complementary	51,04%
Formatter	47,39%
Resource researcher	47,19%
Team worker	45,83%
Coordinator	40,27%

It is suggested that the Recommendation System should end with the recommendation of a members that fits the needs of the team. Beginning with “Analyze the Technical Training”, the step that verifies if the member possesses the necessary technical skills for the development of the project.

After that, the personality traits of the member should be analyzed with those that the project team seeks and finally, recommend it. Members must already be registered in the system, with their technical training and the percentages of each related characteristic from the result of the personality trait test. This flow refers only to a part of the system, which should consider other aspects as well, such as training, hiring third parties, among others.

Given this, the recommendation system may have several functionalities focused on technical characteristics, such as those proposed by Mengato (2015) in a system to support the allocation of human resources in software development projects.

Mengato (2015) proposes the “Allocate Employees” functionality that presents the Compatibility, Availability and Experience of the members that are registered in the system and can compose the team of a project. In this system, the allocation is proposed in a manual way, in which the manager checks among the members which have the highest compatibility with the required function and also verify their availability and the time of experience. It is observed that this system proposed by Mengato (2015) could consider, besides the technical characteristics, the personality characteristics of each member.

Finally, two configurations are suggested for the Project Team Recommendation System:

- 1st Configuration: the project manager could enter into the system the technical training, personality characteristics and the number of members desired for their project team. In this way, the manager has the freedom to establish the composition that he considers appropriate to his team according to the characteristic of the project. In addition, the recommendation system may offer the option of establishing weights for the profiles or characteristics, thus, the customization of the team becomes more detailed, facilitating the formation of an ideal project team. After the manager enters the data, the recommendation system can automatically combine the information, establishing links between the technical skill and the personality of the employee, and then recommend it to the team.

- 2nd Configuration: the manager defines only the technical profile and the system recommends the ideal personality characteristics, based on the profiles considered essential by Belbin (2010a). By default, the recommendation system will take into account, first, the essential profiles already mentioned (Coordinator or Formatter, Plant and Monitor), and according to the number of members, the other profiles will complement the team.

## 6 Final Considerations

In this article, we propose a support model for the formation of project teams. The motivation of the work was the fact that the personality of the members influences the success of the team. However, the literature in the area establishes the recommendation based on the principles of similarity. Considering that individuals with similar personality traits may in certain contexts compromise the success of the team (e.g., many managers), the proposed recommendation system was based on the complementarity (differences) of personality traits.

With the personality test models and the characteristics listed for the formation of project teams, it was possible to propose a test model that evaluated the personality traits in a significant way for the characteristics of a project team.

To identify the personality of the individuals, tests were applied. The test model used was NEO-IPIP, which uses 300 questions to identify personality traits. The questions were refined, based on work in the literature, resulting in 72 questions. A questionnaire with these questions was applied to 30 people, allowing to conclude that it is possible to identify personality differences through it. Once the profiles are identified, the team can be constituted in a way that complements the skills.

It is hoped that this research can contribute to project management since the composition of the team is something preponderant to obtain efficiency and effectiveness in the development of a project.

After all the theoretical basis and from the analyzes and applications made it possible to perceive that the personality traits are influencers of the behavior of an individual also in the professional scope. In this way, composing a team with different profiles that complement each other in the sense of balancing the emotions and the characteristics (organization, creativity, cooperation, optimism ...) can contribute a lot to improve their performance.

From the proposed guidelines, it will be possible, in future works, to deepen the techniques and algorithms for the implementation of the recommendation system for recommending project teams.

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