

TEAM RESEARCH PRINCIPLES, OR ABOUT THE FUTURE OF INTER-, TRANS-, CROSS- AND MULTIDISCIPLINARITY IN SCIENTIFIC RESEARCH

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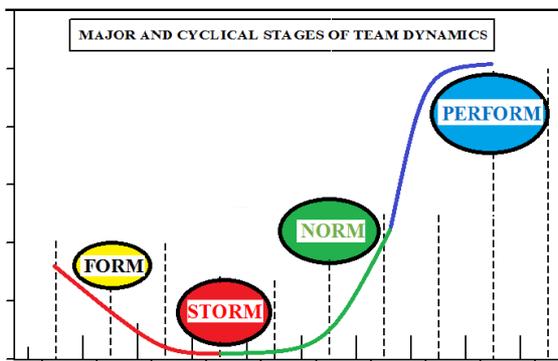
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Abstract. *This paper underlines the importance of team in the contemporary scientific research. A brief history of the concept of team and derived from here of the team principles generates the introduction. The major subjects of the paper are discussed in the fundamental part of the article, and these are the understanding of a modern team, the specific features of the research team, and finally, the article's authors describe the specificity of Mircea Malița's way of thinking about team principles within a project, as the most adequate form of modern research..*

Key words: *research team, team dimension, team research principle, inter-, trans-, cross-, and multidisciplinary.*

1. INTRODUCTION

The scientific literature uses the word *team* in many various meanings. The word *team* means in the common language either a group in which scientists, teachers, researchers work together intensively to fulfill a common goal, or, in a scientific research way of speaking, the team is an association made up of people working together to achieve a mission, and share responsibilities for attaining the expected results [1]. The most usual team in classical scientific research was the so-called "small research team" defined by a small group of researchers with complementary abilities or skills and proved competencies dedicated to solve a scientific problem or project as a common purpose with reciprocal advantages. Out of the people who gathered together or who are part of a research team (built ad hoc or not ad hoc), the great majority of them recognizes the usual cycle stages required by the development of a scientific research team or otherwise knows the classical pattern: i. Forming; ii. Storming; iii. Norm-setting and iv. Performing (Figure no. 1).



Source: Adapted from [2] and Ed Horner graphical vision (2013)
Figure no.1. The stages of team development

Any brief history of the team principles must include

Maximilian Ringelmann, a French agricultural engineer, born in 1861, and his fundamental ideas the so called triad of a performing research team. He succeeded to formulate for the first time perhaps, the major principle of team work: a) the more people pull on a rope, the less effort each individual contributes, though the total force generated by the group rises; b) the optimum team size to complete or achieve a set of tasks seems to be around 3-5; c) the targets designed to be completed by small groups are indeed efficiently conducted by small groups. The four classical principles of the usual team building in contemporary management, are somehow different, but the final results lead to a deeply concordance with Ringelmann's first principle of team work, even today (Figure no. 2).



Source: [3] *The principles of Team Building*

Figure no.2. The classical team principles in management

The modern research team building means the reunion of the more detailed principles known as the "ten gold existence conditions of a team": i) the unity of the research purpose; ii) the profound communication of the information; iii) the embrace conflict; iv) the scientific respect; v) the clear goals; vi) the active and permanent participation; vii) the necessary of partnership and collaboration; viii) the importance of the specific and detailed roles; ix) the full trust; x) the optimal standards able to offer the cohesion, trust and harmony.

2. THE SPECIFICITY OF THE SCIENTIFIC RESEARCH TEAM

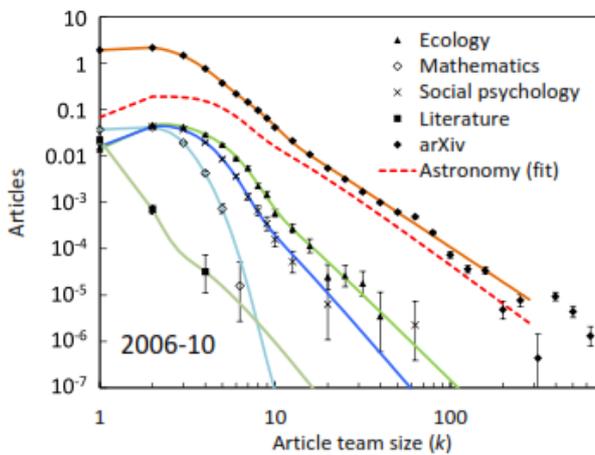
There are important properties of the time and space evolution, and internal structure of teams still uncovered, but

little attention has been paid to the most basic property defined by its size. In the domain of team's size Milojevic's model is

very important being based on two principles:

- a) smaller (core) teams form according to a Poisson process;
- b) larger (extended) teams begin as core teams but consequently accumulate new members through the process of cumulative advantage based on productivity [4].

A lot of studies have emphasized the exponential growth of the dimensions of the scientific research team during the last five decades, especially in published papers work and in the light of different authorship methods and models. The dimension of a scientific research team explodes using the allure of a power law. During the decade between 1960 and 1970 both the core and the extended teams were relatively small (e.g., 1.1 and 2.5 members and the average size of core teams has increased to 3.2 members), between 2006 and 2010, after Milojevic's analysis, the team size has reached the value of 11.2 members (as in Figure no. 3).



Source: Milojevic's paper [4] fig.no. 5 p. 3987

Figure no.3. The evolution of the team size in scientific research

An excerpt from the conclusions of Stasa Milojevic's paper underlines that the team size will continue to grow even in the next decades in the scientific research.

In modern academic education, the entrepreneurial accents of which are obvious, the knowledge acquired by students and graduates, assistant lecturers and professors should be as many theoretical building blocks for construing theoretically and practically implementing projects; in modern research, the research team should be the fundamental, optimized support of the research project, paper, etc.

The concrete activity of conducting and implementing a project or a published paper takes place under the impact of *theoretical and practical premises*, of which it is advisable that each team member does not omit at least the following *factors or minimum requirements* [5,6]:

1. all those involved in the specific activities of the project or of the research paper will *follow the same goals*, otherwise the team selection was useless, and should be resumed;
2. all the objectives of the project or of the research paper will

be declared, so there will be no hidden goals, or goals that were not explicitly stated, otherwise the project manager is incompetent or, what is even worse, dishonest;

3. all those involved in team research team will be under the *presumption of honesty* (to one another), if this truth is not met, then the team cannot be functional;

4. each of the team members must possess a minimum, yet sufficient stock of knowledge and experience in project management or as a member of a team writing a scientific paper (including the field or scope or the project in question), otherwise the project manager's decisions cannot be operative;

5. all those who are part of the team will meet in order to successfully complete the project or the research paper that will work on, so they know the success criteria;

6. all those who are part of the team will know the project's or the research paper's goals one by one, thus understanding the importance of certain activities in the final realization of the project, much more easily;

7. all those who make up the team will be informed clearly, promptly and in detail about those aspects considered as essentially relevant about the funder, their objectives, those targeted by the project or the research paper (information about who the client, target audience or group of users are).

The first four questions you the research project manager or of the main author of a published paper should answer, in the practice of forming and the functioning of a team, are related to how he selects a relatively homogeneous team that is appropriate to the scientific target, then what kind of responsibilities will be assigned to the team, then how their responsibilities will be communicated to them, and, finally, how the project or the published paper's tasks will be adjudicated individually.

The research project or the paper are concepts strongly related to how human actions or activities are understood. The main feature of a research project or paper nowadays are their threefold collective character: through the target group as beneficiary, through the partnership as initiation, and through its team spirit as achievement [7]. Of the three features of a project or article, however, the dominant one is its conducting in terms of team spirit.

But before trying to comply with these truths or minimum requirements, all the participants in a project must know the laws of a team, summarized in a famous formula by Romanian mathematician Mircea Malița: "common language and heterogeneous contribution" for all the co-workers in the project [8,9]. A fact that was first reported in the Romanian economics literature by Costin Murgescu, and magisterially synthesized by Mircea Malița, identifies five principles considered vital to address an economic and social project, or papers and books authored jointly, by means of "team spirit" [8,10].

A first principle of team operation is *refusal of identity*, expressed by the already established formulation: "two identical people will never be a real team, able to solve a complex project or article."

However, the extreme situation must also be carefully evaluated when the people involved are so different that there no common language can hold between them. Aggregating qualitative diversity of the team members replaced their simple quantitative summation once and for all, over the whole life cycle of a project, or book, or article, from their initiation to their writing and eventual implementation. Refusal of identity ineluctably matches, via the project, book, or article, the heterogeneity of the team members.

A second important principle is recognized by asserting the *primordial significance of the project, book or article*. Thus, a project, a book or a paper exist and last as long as the team members understand that team spirit is subordinate, no less than the team as a whole, to the spirit of the project, book or paper. Consequently, modern society will, through generalization, encourage projects, books, papers that are original and innovative, rather than teams or institutions that are eternal or “frozen”.

A third principle can be summarized in the formulation: *it is advisable that the manager should be the centre or the node of the relational network within the team*. In terms of practical details, any team has a centre or a relational node, identical to the “de facto” manager of the project, book or article, which the whole team should be subordinate to. Normally, this “de facto” manager will become the formal manager, being the person in the team network who has the maximum number of real connections with the team members. The team that does not cultivate, but denies or reduces its centre, annul their project, book or article, and condemn themselves to extinction.

The fourth principle is the principle of *multidimensional thinking and systemic action of the team*. According to this principle, the team’s thinking essentially differs from the qualitative thinking of the individual team members, who conduct the project through a multidimensional, systemic (or “whole”) approach rather than as a result of aggregating the part-wise individual (i.e. one-dimensional) approaches.

As can be easily found, there is an obvious analogy to the distinction between mere summing and statistic aggregation, and it coincides with the synthetic approach, where the system is more than the sum of its parts. The fifth principle, that of team spirit quality, states that team spirit and teamwork in achieving the project, book or paper is, in point of quality, fundamental different from the individual spirit of those who make up the project team and work towards that target. The spirit of cooperation, solidarity, cohesion, or, in general terms, spirit of partnership, partner intelligence and development towards total partnership are to be educated, they are constantly acquired, accumulated.

3. SOME FINAL REMARKS

The team members should not be many, in terms of number and quantity, but rather cover the issues of the project in terms of

quality: so, “*non multa, sed multum*”, or, in a more modern variant, “*non numero, sed pondere*”.

In today’s projects, books and papers, effective management team focuses, among other things, on three success criteria for its structure:

i) it is recommended that the team manager does not come from the scientific or professional field specific to the project, book or paper;

ii) the success of the project, book or paper is inversely proportional to the value disparity of the team members’ level of intelligence,

iii) closely comparable individual practical performance of the team members increases the chance for the project, book or paper to be eventually declared a real success.

Poor management of a team in research projects, books or papers is due, among other things, to the manager’s or first author’s excessive involvement in the technical details of the project, book, paper, by the team’s polarizing heterogeneity and the inequalities in the team members’ individual practical performance [11] ...

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