

RESULTS OR RELATIONSHIP ORIENTATIONS OF A TEAM MANAGER IN PERSPECTIVE OF USING ARTIFICIAL INTELLIGENCE IN MANAGEMENT

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Purpose: The aim of this paper is present a solution to the research problem can concerning the dilemma of which of the extreme management styles - results orientation or relationship orientation - provides greater efficiency and effectiveness of the manager's actions in perspective of artificial management.

Design/methodology/approach: There are answers to two research questions: (RQ1) to what extent does the results or relationship orientation of a team manager affect efficiency? (RQ2) To what extent does the results or relation orientation of a team manager affect effectiveness? The answers were formulated on foundation of the original concept of methodology in management reality and research on human managers' behavior using online management tools as research tools (TransistorsHead.com).

Findings: First, (RQ1) there was no relationship between the leadership style adopted - either results orientation or relationship orientation - and the efficiency of team manager. Second, (RQ2) there was no relationship between the leadership style adopted - either results orientation or relationship orientation - and the effectiveness of team manager.

Research limitations/implications: The study involved in 12 virtual team and every team consisted of team managers and 3-4 members. All the team members could take managerial actions and use all online management tools, however the study concerns only team managers.

Practical implications: The last 20 years there has been a rapid development of information technology, robotics and replacing people's work with machines or algorithms. Therefore the area of team management automation and its consequences seem to be dominant area of research in the nearest future as well as practical implementation of this research.

Social implications: In the literature and in the public domain an important discussion has started how artificial intelligence will change our social life. It seems that the same implications consider the artificial management.

Originality/value: The system of organizational terms used to represent managerial competences as managerial actions, recorded by online management tools (TransistorsHead.com).

Keywords: results orientation, relationship orientation, team management, artificial management, artificial intelligence.

Category of the paper: Research paper.

1. Introduction

Research on Artificial Intelligence (AI) in management slowly appears as a challenge for the future which means the cooperation between humans and AI agents in organizations (Teddy-Ang, Toh, 2020). Therefore AI in management seems to exceed any other technological breakthrough that humanity has ever seen (Antonescu, 2018) and human-machine teaming (HMT) seems to be a promising paradigm to approach future situations in which humans and autonomous systems closely collaborate (van der Vecht, van Diggelen, Peeters, Barnhoorn, van der Waa, 2018; Peifer, Jeske, Hille, 2022).

After the first age of robotics in mechanical processes and manufacturing rapid development of computer science and Internet has given opportunities to replace team managers with robots (McAfee, Brynjolfsson, 2016). This would be the real accomplishment of Peter Drucker's words that in the future "computers" will not only make decisions but they will do much more (Drucker, 1967).

However, in the path of replacing the human manager with a robot manager, the question arises of who is a manager and whether there are any universal managerial traits (Yukl, 1990; Stogdill, 1974). In search of these answers, theories of managerial traits were created. They have been and are still popular today, but it is very difficult to use their results, as there are large discrepancies in researchers' views on the characteristics of effective managers and on the measurement of these characteristics (Judge et al., 2002).

A distinction is made between efficiency and effectiveness of a team manager. This comes from, firstly, the organizational performance, and secondly, from achieved results (March, Sutton, 1997). Some authors (Henri, 2004) treat these concepts as complementary, where organizational effectiveness is seen as the result of organizational effectiveness, and measurement of organizational efficiency (performance) can be done together with assessing effectiveness (results). Therefore this is the main assumption in our approach to artificial management. The designed artificial manager (Flak, 2020) must be at the same time efficient and effective.

Taking into account the theories of team management, and in particular the concepts of management styles studied since 1964 by Blake and Mouton (Flak, Pyszka, 2022), a research problem can be posed concerning the dilemma of which of the extreme management styles - results orientation or relationship orientation - provides greater efficiency and effectiveness of the manager's actions.

Regarding the above research problem, the paper answers the following research questions:

- RQ1: To what extent does the results or relationship orientation of a team manager affect efficiency?
- RQ2: To what extent does the results or relation orientation of a team manager affect effectiveness?

The answer to the above research questions will allow us to take the right direction in the work on the design of artificial managers (Flak, 2020), thus realizing the idea of artificial management, initiated in 1986 (Geisler, 1986). To find answers to the research questions, a long-term non-participant observation method was used with a group of 60 people performing an organizing task. As a research tool, TransistorsHead.com platform was used, which contains 10 online management tools, which are also tools measuring the performance of a manager and his team.

The article in Section 2 describes the theoretical background of team management theories, management based in artificial intelligence and definitions of efficiency and effectiveness of team management. Section 3 presents the methodology of the study conducted, and Section 4 presents the results of the study and answers to research questions RQ1 and RQ2.

2. Theoretical background

2.1. Team management theories

As the first theories related to effective leadership, we can point to the approach of Tannenbaum and Schmidt (Tannenbaum, Schmidt, 1958), who proposed that the manager, depending on the requirements of the situation, should use any of the following six leadership styles and use different “proportions” of the influence of the manager and the influence of the group of subordinates (Tannenbaum, 1975):

- recommending - when little time for team decisions,
- selling - when you need to quickly convince employees of a solution,
- testing - to predict employees' reactions when consulting - subordinates' reactions and ideas are important,
- collaborating - to enrich your solution ideas with proposals from your subordinates,
- delegating - to leave the group complete freedom without imposing a solution in any way.

Recommending and sell leadership styles are used in situations where the manager is in very favorable social conditions, when subordinates lack motivation to perform a task, when their level of understanding of the situation is not very high and there is not enough time for explanations (Tannenbaum, Schmidt, 1958). Other leadership styles should be used when subordinates want to be involved in task performance and have a say in the final decision. Total influence on decision-making can be held by the group in such situations where subordinates' acceptance of the final decision is critical to the organization's effectiveness (Tannenbaum, 1975).

Another approach to effective leadership was Vroom's theory (Vroom, Jago, 1978). Some of his early research showed that subordinates with certain characteristics working on certain types of tasks preferred autocratic leaders (Kozusznik, 1985). Based on this assumption, Vroom assumed that leaders have the ability to change behavior on a continuum from highly autocratic to highly participative, so the leadership problem becomes the development of criteria for evaluation to help leaders decide for themselves in which types of situations to apply the appropriate type of behavior. Often this approach is compared to the work of Fiedler, who measured the characteristics of leaders using the LPC method (Fiedler, 1967), but Vroom was always more concerned with tasks and subordinates (Vroom, Jago, 1978).

Another approach worth presenting was the leadership theory of Hersey and Blanchard. They began their analysis of leadership effectiveness by rejecting the idea that there is a single ideal leadership style, since all the results of research on various dimensions show that satisfied groups can be led using any style (Hersey, Blanchard, 1977). Hersey and Blanchard's proposal was based on the premise that the more managers try to make their leadership style meet the requirements of the situation and meet the needs of the particular situation and the needs of their subordinates, the more effective they will be in achieving organizational and personal goals (Hersey, Blanchard, 1977).

Hersey and Blanchard focus on the needs of subordinates, which, as we can see, is in opposition to Fiedler's assumption that it is leaders who must seek out situations that meet their leadership style (footnote) and to Vroom's assumption that leaders should adapt their leadership style to the type of task (Fiedler, 1979).

Hersey and Blanchard distinguish 4 basic leadership styles and call them depending on the high or low dimension of consideration for others consideration for the task - selling, participation, delegating, commanding (Hersey, Blanchard, 1977). Effective managerial behavior is defined as behavior that is appropriate to a given situation within the larger environment (Kozusznik, 2014).

Thus, Hersey and Blanchard are not particularly different from other theories of "relativity" and relativity of management. However, they introduce a new variable - a key dimension of the environment - the maturity of subordinates, or their readiness to take on the tasks facing the group.

Research on managerial behavior and its relationship to performance (so-called "behavioral" concepts) has yielded more categorical settlements on the interrelationship of the manager's persona and the manager's situation (Yukl, 2006). In the "behavioral" circle, for example, is the concept of Bowers and Seashore (1969), who distinguished four factors of management:

- behaviors that sustain the formation of a subordinate's sense of self-esteem and importance,
- behaviors that facilitate interaction (helping group members form close and satisfying group relationships),

- behaviors that emphasize the importance of the goal (generating group enthusiasm and quality performance),
- behaviors aimed at facilitating work (planning, coordinating, organizing, etc.).

An effective manager is more likely to exhibit these behaviors than an ineffective manager, but the strength of the relationship between these behaviors and effectiveness depended on the type of organization in which the research was conducted and the manager's power, place in the organizational hierarchy (Yukl, 2006).

From the point of view of the implementation of management based on artificial intelligence, the entire spectrum of research on leadership issues, which began at Ohio State University in the 1940s, should be considered an important research program. In it, researchers focused on defining exactly what type of behavior is exhibited by leaders at any given time (Stogdill, Shartle, 1948; Avolio et al., 2009). Thousands of behavioral descriptions were eventually reduced to two independent dimensions called initiating structure (i.e., task orientation) and consideration (relationship orientation). Leaders with a high task orientation will assign tasks to group members, emphasize meeting deadlines, expect employees to follow routines exactly, communicate exactly what is expected of them, and so on. Leaders with a high relationship orientation - find time to listen to employees, are friendly and direct, help subordinates solve personal problems, embrace subordinates, etc. (Kozusznik, 2014)

This concept found a place in Blake and Mouton's famous study (Blake, Mouton, 1981) and is still widely used in management training today. It is based on a similar premise and argues that the ideal approach is one that is simultaneously people-oriented and production-oriented, but provides no clear evidence of whether this is psychologically possible (Schein, 1988).

This division was developed into Blake and Mouton's grid of management styles and includes withdrawn, autocratic, relational, balanced and integrated styles (Blake, Mouton 1964). It is worth mentioning that in their further work, Blake and Mouton (1981) also distinguished between dominant and backup leadership styles. In this view, a dominant style is one of the five proposed by these authors, commonly adopted by a manager. A backup, on the other hand, is a leadership style that is adopted under special circumstances, such as an exceptionally stressful situation (Flak, Pyszka, 2022).

However, a newer concept of management styles makes them simpler in meaning and introduces the division into two management styles: participative and authoritarian (Jago, 2017). The participative management style assumes that employees want to make decisions concerning their work on the foundation of the idea of participative management of McGregor's Theory X – Theory Y (Hines, 1974). Participative managers are trying to empower and reward their subordinates and always open to employees' participation. They also allow workers to enhance their professional skills. The participative style of management fosters experimentation and risk-taking (Cheng, Bolon, 1993). The opposite style is the authoritarian management. It is sometimes described as a paternalistic leadership (Morris, Pavett, 1992). The authoritarian

style limits employee's or manager's creativity and has a negative impact on the staff's motivation (Karakitapoglu-Aygün, Gumusluoglu, 2013).

Therefore, in the article, in order to answer the research questions, the task or relations perspective will be used as a theoretical basis, which, by means of the research method used, has already been tested in previous publications by one of the authors (Flak, Pyszka, 2022).

2.2. Management based in artificial intelligence

The first vision of artificial management were spoken in words that in the future "computers" will not only make decisions but they will do much more (Drucker, 1967). Looking for an answer if it is possible to replace human team managers with robots, terms "artificial management" and "artificial manager" were created (Geisler, 1986). The concept of artificial management and its operational consequence in person of in artificial manager was seen as a dehumanizing attempt to eliminate participation of human managers in the processes of the organization. Therefore most of researchers considered artificial management applications only in organizational decision systems or routine operational processes which were well structured (Courtney, 2001; Gigerenzer, Gaissmaier, 2011). Eventually, it led to a strong need of establishing some patterns of team managerial work (Halliday, Stacey, 2009) or it is focused on automated decision making (Zimmermann et al., 2019).

However, nowadays AI overwhelms more and more areas of managerial actions. Artificial intelligence (AI) is emerging as a potential growth area for facilitating the improvement and development of teams in the workplace. AI, as used in the team context, is currently underdeveloped and limited, thus reducing the wide-scale adoption and implementation of AI to improve team effectiveness (Webber et al., 2019). New applications such as robotics, automation or intelligent assistance are becoming drivers of a wide-ranging change process in companies which requires reorganisation of team management, particularly in virtual teams (Franken, Wattenberg, 2019). However, you still can't buy a manager who would be Steve Jobs for any company.

2.3. Efficiency and effectiveness of management

In the literature, one can find a number of approaches to work efficiency and effectiveness. The difference between effectiveness (effectiveness) and efficiency (efficiency) can be shown from three perspectives (Talebnia, Dehkardi, 2012):

- a systems approach, focused on input,
- an organizational approach, when efficiency is the result of analyzing goals through the way resources are used,
- the factor approach (quantitative and qualitative), where understanding quantitative is concerned with efficiency, and qualitative is concerned with effectiveness.

Firstly, as the efficiency is concerned, there are many synonyms for the of the term. Reviewing articles, one can find many terms that are close to efficiency, e.g. effectiveness, efficiency, efficacy, performance, which makes it difficult to clearly define efficiency and understanding its nature.

In this perspective team work efficiency has to be analysed by decomposing projects into detailed phases of the project lifecycle and comprehensively measure project management practices and performance. Supporting this argument, empirical studies (Scott-Young, Samson, 2009) have shown factors that determine the success of the projects connected to four different input dimensions i.e. organizational context (clear goals, senior management support), team design (cross-functional integration, team member experience, virtual office use, team continuity), team leadership (continuity, incentives linked to objectives), team processes (problem solving).

Empirical research also supports this point of view, indicating that especially in the virtual teams the main issues are connected with managing efficient communication among team members, facilitating the integration of the skills and abilities, providing efficient mechanisms to introduce technology support, incorporating effective mechanisms for shared knowledge management (Goldmann, 2023). Such virtual teams must face various difficulties coming from the complexity of internal relations and external factors that impede the implementation of tasks and agreements i.e. a lack of understanding of goals and requirements assigned to the team, difficulties in communication because of physical distance, differences between processes and management mechanisms and skills, problems with sharing knowledge among team members etc. (Guzma at. al, 2010).

Therefore in the paper the efficiency of the team manager concerns the processes towards the aimed results.

Secondly, as the effectiveness is concerned, in the literature we can find five common themes were derived from the research on effective work groups, and then characteristics representing the themes were related to effectiveness criteria. Themes included job design, interdependence, composition, context, and process. They contained 19 group characteristics which were assessed by employees and managers. Effectiveness criteria included productivity, employee satisfaction, and manager judgments (Campion, Medsker, Higgs, 1993).

Another approach to team effectiveness draws on different theoretical perspectives including work design, self-leadership, sociotechnical, and participative management, four categories of variables are theorized to predict self-managing work team effectiveness: group task design, encouraging supervisor behaviors, group characteristics, and employee involvement context (Cohen, Ledford, Spreitzer, 1996).

Cooperation between team members plays a central role in most team effectiveness model (Mathieu et al., 2008) and they are categorized as “taskwork” or “teamwork”. Taskwork describes functions that individuals must perform to accomplish the team’s task. Teamwork describes the interaction between team members (Costa, 2003).

Therefore in the paper the effectiveness of the team manager concerns results achieved by processes taken during the teamwork.

3. Research methodology

Long-term non-participant observation was used as the research method, with observation participants using online managerial tools. The methodological basis of the study conducted is the organizational size system, which is an original concept for studying organizational reality (Flak 2018). In the organizational size system, a manager's activity is represented by a combination of "event" (derived organizational term) and "thing" (primary organizational term) (Flak, 2020). The event or thing is denoted by the symbols n.m, where n specifies the number of the event or thing, and m specifies its next version. Based on the organizational size layout, 10 managerial tools were designed and implemented, the function of which is also to record the parameters of 10 managerial actions during their use. In this way, online managerial tools function as research tools (Flak, 2020, 2021; Flak, Pyszka, 2022; Flak, Kożusznik, 2023). The principle adopted in the organizational size system is that changes in the characteristics of "things" (primary organizational terms) that are created or changed by "events" (derived organizational terms) are measured.

The tools are available on the TransistorsHead research platform at: <http://transistorshead.com>. An example of the layout of various managerial actions is illustrated in Figure 1.

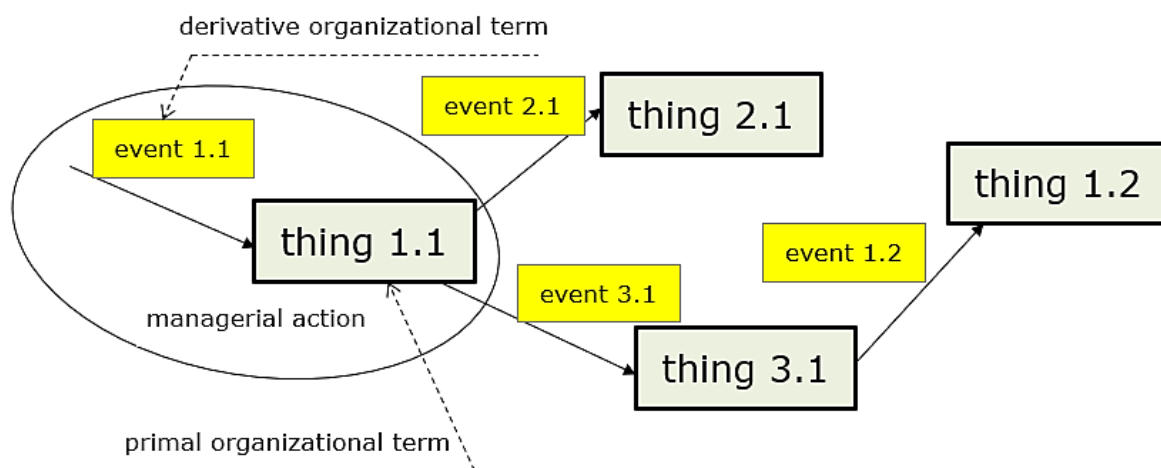


Figure 1. Example structure of managerial activities.

Source: own elaboration.

Due to the classification of management styles (Blake, Mouton 1964), the managerial tools were divided into 2 groups containing 4 tools each: relationship-oriented and results-oriented. 2 online managerial tools were not used at all in the study due to their synchronous mode of

operation, which would interfere with the recording of managerial actions as described in Figure 1. Table 1 shows the functionality of each online managerial tool and their assignment to the dimension forming the management style according to Blake and Mouton (1964).

Table 1.

Functionality of online managerial tools in the TransistorsHead platform

Name of the managerial tools in TransistorsHead	Number of a managerial action	Name of the managerial actions	Used in the research	Dimensions of leadership style according to Blake and Mouton (1964)
Goals	1	set goals	yes	results
Tasks	2	describe tasks	yes	results
Ideas	3	generate ideas	no	
Specifications	4	specify ideas	yes	relations
Options	5	create options	yes	results
Decisions	6	choose options	yes	results
Motivation	7	check motivation	yes	relations
Conflicts	8	solve conflicts	yes	relations
Meetings	9	prepare meetings	no	
Problems	10	explain problems	yes	relations

Source: own elaboration.

The long-term observation was conducted in December 2023 and January 2024 among the students of management faculty of Jan Kochanowski University of Kielce, Poland. The study involved in 12 virtual team and every team consisted of team managers and 3-4 members. All the team members could take managerial actions and use all online management tools, however the study concerns only team managers.

4. Results of research

Using the survey methodology described in Section 3, the percentage of work time in which individual team managers manifested either a relationship orientation or a results orientation was determined. The percentage of team managers' working time by either relationship orientation or results orientation is shown in Table 2.

Table 2.

Percentage of work time when team managers manifested either a relationship orientation or a results orientation

	team managers											
	1	2	3	4	5	6	7	8	9	10	11	12
% of time in relation orientation	36	39	50	35	37	21	37	44	53	58	39	65
% of time in results orientation	64	61	50	65	63	79	63	56	47	42	61	35

Source: own elaboration.

In answering the first research question RQ1, i.e. to what extent does the task or relationship perspective of a team manager affect efficiency, a comparison was made between how much of a team manager's working time manifested either a relationship orientation or

a result orientation to the number of managerial actions taken by team managers. In accordance with the theoretical considerations presented in Section 2, it was assumed that a manager's actions are more efficient the fewer managerial actions he or she has taken to achieve a set result.

In Figure 2, we have shown for each team manager the relationship between the percentage of a manager's time worked in results orientation and the number of managerial activities he or she undertook. The data can be read as follows. For example, manager No. 12 (see Table 2) had 35% of his working time in results orientation and at the same time 65% in relationship orientation, he performed 1353 managerial actions.

As can be read from Figure 2, there is no strict relationship between results orientation (and vice versa - relationship orientation) and the number of managerial actions. Although a trend line could be drawn, it is a polynomial function of the 6th degree and there is still a rather low correlation coefficient. So, there is no relationship between the adopted management style - either results orientation or relationship orientation - and efficiency of team manager. Thus, it can be said that the results or relationship orientation of a team manager does not affect the efficiency a team manager.

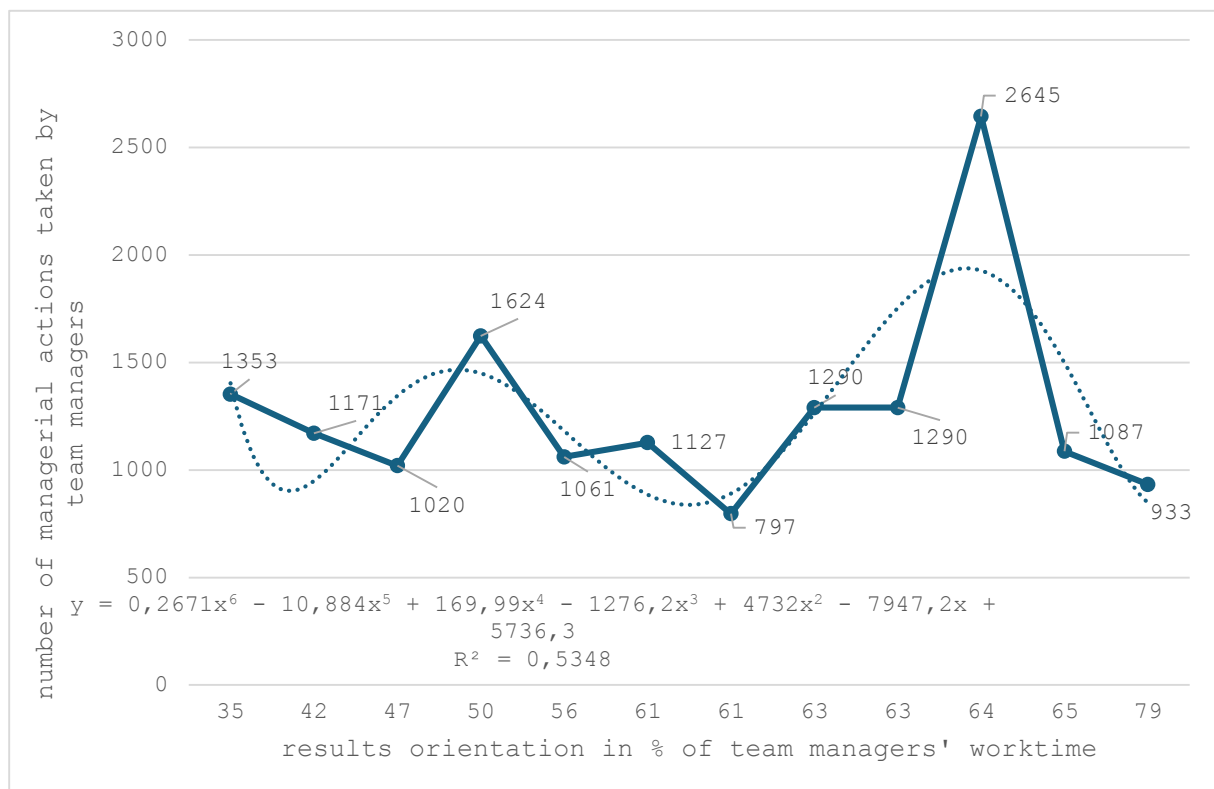


Figure 2. Relationship between the percentage of managerial time and the number of managerial activities undertaken by the manager.

Source: own elaboration.

Answering the second research question RQ1, i.e., to what extent does the task or relationship perspective of a team manager affect effectiveness, compared how much of the team manager's work time manifested either a relationship orientation or a results orientation

to the final results of the work on the organizing problem solved by team managers. The results of the work were rated by the authors of the study on a university scale from 2 to 5, and were also the final evaluation of the participants. According to the theoretical considerations presented in Section 2, it was assumed that the manager's actions are more effective the closer the result is to the desired version, in this case it had the highest grade.

In Figure 3, we have shown for each team manager the relationship between the percentage of the manager's time worked in the results orientation and the final result of working on the organizing problem. The data can be read as follows. For example, manager No. 12 (see Table 2) had 35% of his working time in results orientation and at the same time 65% in relationship orientation, received the highest result in solving the organizing problem receiving a grade of 5.0.

As can be read from Figure 3, there is no close correlation between the results orientation (and vice versa for relationships) and the grade obtained from solving the organizing problem.

Similarly, as in the case of efficiency team manager, a trend line could be drawn, but it is a polynomial function of the 6th degree and the correlation coefficient is very low. Thus, there is no relationship between the leadership style adopted - either results orientation or relationship orientation - and the effectiveness of a team manager. Therefore, it can be said that the results or relationship orientation of a team manager does not affect the effectiveness of a team manager.

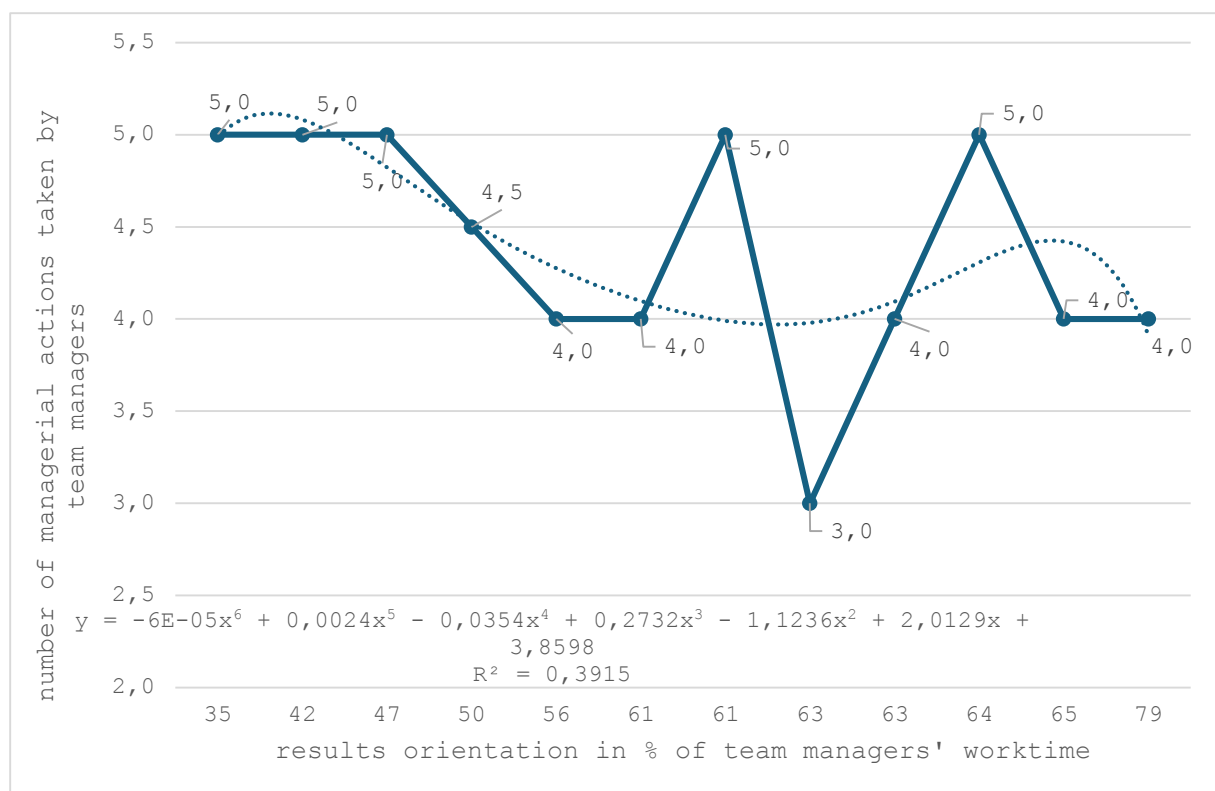


Figure 3. Relationship between the percentage of managerial time and the score obtained from solving the organizing problem.

Source: own elaboration.

5. Conclusions

The automation of a manager's work has stirred up a lot of controversy and emotion due to the fact that a manager's work has been perceived for decades as one of the activities most attributed to humans. During this period, thousands of studies have been written on the three main representations of managerial work, namely management styles (Blake, Mouton, 1965), managerial skills (Katz, 1974) and managerial roles (Mintzberg, 1980). However, none of these approaches were adequate enough to implement artificial management.

The results of the research presented in the paper show the relationship between the concept of management styles (Blake, Mouton, 1965) and the concept of managerial actions (Flak, Yang, Grzegorzek, 2017; Flak, 2018). The research problem concerned the dilemma of which of the extreme management styles - results orientation or relationship orientation - provides greater efficiency and effectiveness of the manager's actions.

Answering to the research questions of the studied group of 12 team managers, the following can be concluded. First, (RQ1) there was no relationship between the leadership style adopted - either results orientation or relationship orientation - and the efficiency of team manager. Second, (RQ2) there was no relationship between the leadership style adopted - either results orientation or relationship orientation - and the effectiveness of team manager.

It can be concluded that the theoretical construct of leadership styles cannot be used to represent the work of a manager and design automation of his work based on artificial intelligence. The authors of the paper have conducted extensive research on the implementation of artificial management and team management automation, and the authors plan to further test theoretical concepts that enable the implementation of artificial intelligence in the work of a team manager.

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