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The system of organizational terms used for recording managerial activities in the field of team motivation

Olaf Flak¹

Abstract

The aim of the paper is to present an answer to the research question whether the system of organizational terms (an original methodological concept in management science) can be a theoretical foundation to record managerial activities in the field of team motivation. To answer this research question, a non-participating, structured observation was used as a research method. The author was a moderator of this research. A mobile application was used as both a research tool and a time management tool by team managers and team members. As a result of the observation, the use of the system of organizational terms was verified as the theoretical background in recording managerial activities in the field of team motivation. The research results show the possibility of using the system of organizational terms to design mobile applications aimed at team management automation, which could make a significant contribution to management science in the future. In the presented research, two primary organizational terms were recorded: motivation and a motivating plan. The structure and values of their measured units are described in the paper in detail.

Keywords: motivation, team management, system of organizational terms

1. Introduction

Since the Internet was invented, there has been a continued and inevitable digitalization and automation of the contemporary world (Haigh, Russell, & Dutton, 2015). On the one hand, it is possible to notice that managers more and more often use online tools that can record their work (Ewenstein, Hancock, & Komm, 2016). On the other hand, there are more and more scientific papers on

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replacing human managers with software and, consequently, with machines as managers (Chui, Manyika, & Miremadi, 2015).

It is worth admitting that in 1967 P. Drucker wrote that computer systems (in those years – computers) would not only be used to gather data on some activities, but the algorithms implemented there would also be able to replace human managers' work over time (Drucker, 1967). Although computer systems penetrate and automate more and more human activities, and consequently also managerial work, despite these few decades, it has not happened (Harper, 2020).

In order to make team management possible, it is necessary to solve a research problem, which concerns (1) the types of team management processes and their content (content domain), (2) a sequence of team management processes in reality (time domain), and (3) the psychosocial characteristics of a team manager and his team members, which are connected to particular team management processes (psychosocial domain) (Flak, 2020). In other words, it is necessary to answer the general research question: what does a manager really do? (Sinar & Paese, 2016)

This paper is a part of the long-term research conducted by the author that aims at designing and implementing management tools, which can record a manager's activities in team management. The purpose is to recognize the patterns of behaviors of managers and automate some team management processes. When the author was granted a project to create a mobile application used by managers to motivate their team members, he formulated a particular research question: can the system of organizational terms (an original methodological concept in management science created by the author) be used as a theoretical foundation to record managers' activities in the field of team motivation?

After finishing the project, it was possible to answer this research question. Therefore, the aim of the paper is to present a way of using the system of organizational terms to record a manager's activities in team management and recognize the possibilities in managerial behavior automation, which in the future could lead to replacing a human manager with a robot. It should be emphasized that this paper is a research report on using this methodological concept. It is not aimed at any contribution to any research problems in organizational reality, including team motivation.

The research method that was used in the phase of searching for an answer to the research question was a structured non-participant observation, where the author of the paper played the role of a moderator. The mobile application was a research tool as well as a management tool installed by users (Flak, 2017). The management tool is called Team Motivator and it was used to examine team members' motivation, and plan motivating activities

by a manager. The research was conducted in the period from 27.01.2020 to 10.02.2020. Five teams of employees took part in the research as well as one student group during the management techniques course (a subject in the first year of their masters' studies, "Film and television production" at Krzysztof Kieslowski Film School, the University of Silesia in Katowice). Because of the limited length of this paper, only parts of the research results of one of the employees' teams are described. Research results on the other teams taking part in the research were achieved in the same way and the only differences are the measured values.

Section 2 details the main characteristics of the system of organizational terms and theoretical foundations of concepts, which were operationalized and measured, particularly concepts of motivation and a motivation plan. Section 3e presents both of these concepts as two primal organizational terms, used to design the mobile application, Team Motivator, and recorded by this application in real-time. There is also a description of the application's functions and a procedure for using it. Additionally, there is a plan of the conducted research. Section 4 gives the results of the empirical research on managerial activities in the field of team motivation focused on one of the team members as an example. In Section 5, there are conclusions drawn from the research and the perspectives of the authors' scientific aims.

2. Literature background

As the next part of the description of using management processes automation, it is possible to show examples of many research studies concerning attempts at automation in many different areas of company management. There are attempts in logistics processes in the value chain in a company (Dash, McMurtrey, & Rebman, 2019), services in the IT sector for their own clients (Keller, 2017) as well as team management automation (Davenport & Kirby, 2015; Filder, 2015). The last area of automation seems so universal that it is an important element in any organizational management automation.

Taking into consideration what was written above, it is possible to ask the question:

RQ: Why can we not employ a robot in a managerial position at the beginning of the third decade of the 20th century?

Although the answer to this question is not so easy, in order to make it possible, several conditions should be met:

- it should be possible to predict the behavior of managers and team members (Klein, 2005);

- the possibility of a real influence of such an artificial manager on team members should exist (Christoffersen & Woods, 2002);
- there should be a mutual basis for communication for an artificial manager and team members, which means shared concepts and their meanings (Clark & Brennan, 1991).

The first condition concerns an analysis of the behavioral patterns of human managers and team members. From the perspective of existing pattern recognition techniques, this is not a novel and important scientific problem (Theodoridis & Koutroumbas, 2008; Flak, Yang, & Grzegorzec, 2017). The second condition describes some kind of physical and psychological interdependence of an artificial manager and its team members. This aspect needs to be thoroughly explored by scientists because it is a different source of managerial authority compared with a common pattern of a human manager and a human team member (Kocak, 2019). The third condition mentioned above was a core of the design of the methodological concept called the system of organizational terms (Flak, 2018), which is to play a similar role in organizational reality research to the International System of Units (SI) in physical action automation (Goebel, Mills, & Wallard, 2006).

The system of organizational terms is a holistic, coherent, and formalized methodological concept in management science, which allows for studying organizational reality, to a large extent overcoming most present methodological problems in management science. Firstly, the concept is holistic, which means it covers with its assumptions most scientific areas and constructs such as ontological and epistemological assumptions, use of a language, reasoning methods, etc. Secondly, the system of organizational terms is coherent, so it is internally consistent and complementary. Thirdly, the concept is formalized, which means that there are strictly defined rules on how to use particular elements of science. The rules are either general or particular, as well as described in a universal and scalable way (Flak, 2018).

Historical inspiration for designing the system of organizational terms and the recording methods of the organizational terms came from a study conducted by the Gilbreths, who tried to classify the rudimental movements of workers by the use of a cycle graph (Peszko, 2002). Furthermore, the classical method of work time research was taken into consideration (Bieniok, 2001). In the system of organizational terms, a process in an organization (Brajer-Marczak, 2016) is represented by an event, and a resource in an organization (Barney, 1991) is represented as a thing. Both events and things are the facts that appear in organizational reality (Wittgenstein, 2000). This organizational reality also consists of manager's activities. The facts can be presented by an organizational term, which is a symbolic object and an element that belongs to organizational reality model (Rios, 2013). The organizational

terms do not exist in organizational reality. They are only abstracts, they exist in a language and they are used to store information about a certain fact (Frankfort-Nachmias & Nachmias, 2001). When the organizational term appears, it can change in a function of time in a qualitative, quantitative, mereological, and substantial way (Gryganiec, 2011).

From the ontological point of view of organizational reality, the organizational terms can be logically divided into two classes: primal organizational terms and derivative organizational terms (Przybyłowski, 1999). The primal organizational terms are the symbols of facts in the class of things (resources in an organization) and the derivative organizational terms are the symbols of facts in the class of events (processes in an organization). Therefore, the system of organizational terms combines both the research approach and the process approach in management science. The next logical division of organizational terms, both the primary and derivative ones, gives types of organizational terms. The number of types is not limited.

As far as team management is concerned, in the system of organizational terms, a managerial action is represented by a pair of a thing and an event (Flak, Yang, & Grzegorzek, 2017), which are a primary and derivative organizational term, respectively. In the general notation, a thing or an event is called $n.m$, where n means a number of a thing or an event, and m is their version. This approach enables representing managerial actions in a function of time in a way presented by the example of common managerial actions in Figure 2.7.

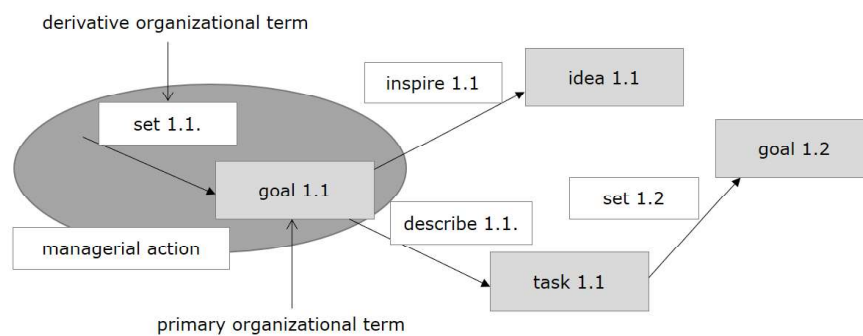


Figure 2.7. An example of a managerial action structure in the system of organizational terms

For example, in Figure 2.7, the managerial action consists of an event “set 1.1” and a thing “goal 1.1.,” which means that a manager started a process to achieve a resource – in this case, he started setting a goal (an organizational

resource). Next, there was an event “inspire 1.1” and as a result of this, a thing “idea 1.1” appeared (for example, in the head of a team member). Meanwhile, a manager could start an event “describe 1.1,” which resulted in a thing called “task 1.1.” Then, a manager again started an event “set” in the second version (set 1.2), which results in the second version of the thing “goal 1.2.” This approach makes it possible to use pattern recognition techniques, and by doing so, to estimate the similarity of team management (Yang, Flak, & Grzegorzec, 2018).

The system of organizational terms as a methodological concept also consists of foundations of designing research tools that could be used to record organizational terms appearing in organizational reality. The research tool records information only on a certain primary organizational term (a resource in an organization in the resource approach) and it is also a management tool that is used by a manager in team management (Chopraa & Gopal, 2011, Kanji, 2002). The research tool is an instrument based on a concept of behavioural unit (Chopraa, & Gopal, 2011). In Figure 2.7, the primary organizational terms, whose features are recorded by the research tool, are grey.

In the author’s previous research, online management tools were used to verify the system of organizational terms. The online management tools were implemented as the Internet platform TransistorsHead.com, available through a browser (Flak, Hoffmann-Burdzińska, & Yang, 2018; Alnajjar & Flak, 2016). However, in the above-mentioned project, which was given to the author as a part of the “Inkubator Innowacyjności 2.0” program, there was a possibility to design a mobile application aimed at (1) examining team members’ motivation and (2) planning motivating activities by a manager. That seemed a good moment to test the system of organizational terms as the theoretical foundation in this area. The project team, which consisted of the author and Dr. Adrian Pyszka (from the University of Silesia in Katowice), chose two primal organizational terms, which became a base for the functionality of the mobile application. The primal organizational terms were motivation and a motivating plan.

The project team faced the dilemma of choosing a theory of motivation. Theories of motivation have been developing rapidly since the first scientific experiments concerning the influence of motivating factors on work efficiency conducted in a manufacturing company in Hawthorne in 1927 by Elton Mayo (Szatyńska, 1972). The next important contribution to the theories of motivation was Abraham Maslow’s paper entitled “Motivation and Personality.” His theory of motivation was based on the hierarchy of needs and it influenced the next generations of researchers in psychology and management science (Lussier, 2019). Launched at the same time were other theories of motivation in the perspective of the so-called theories of content, such as Herzberg’s motivation-hygiene theory and dual-factor theory (Herzberg, 1959; Farr,

1977) and X-Y theory (McGregor, 1960). Another approach to motivation was the so-called theories of process (today, it would be better to describe them as theories of motivation), such as the expectancy theory (Vroom, 1964) and the reinforcement theory (Skinner, 1959).

On the one hand, since that time, many new approaches to human motivation have appeared. On the other hand, these old theories still seem to be used by researchers in social sciences, with the most significant seeming to be Maslow's hierarchy of needs, which is confirmed by many up-to-date studies on motivation (Stefan, Popa, & Albu, 2020; Poirier & Devraj, 2019; Lonn & Dantzler, 2017). Therefore, Maslow's hierarchy of needs was chosen to define the first primary organizational need, which is motivation.

The second primary organizational term, which was used as a theoretical foundation during the designing process of the mobile application, was a motivating plan. From the perspective of managerial activities targeted at meeting the needs of team members, the managerial action aimed at this can be placed in the area of process motivation theories (Ferster & Skinner, 1957; Enckell, 2007). Therefore, a motivating plan is a logical concept whose frames consist of features of a plan and the content is a process motivation theory. In this approach, elements of this concept are the same as in any other plan – content of a task, a task deadline, and task doers (Atkinson, 1999; Mantel, Meredith, Shafer, & Sutton, 2001).

Both primary organizational terms – motivation and a motivating plan – were used as a theoretical foundation in the design of screens of the mobile application. The screens were also the research tools measuring these primary organizational terms in the practice of team management. Detailed characteristics of the organizational terms dimensions and their measured units (Flak, 2010) are described in Section 3.

3. Research approach and methods

The empirical research, which aimed at answering the research question whether the system of organizational terms can be used as a theoretical background to record managers' activities in the field of team motivation, was conducted in the period from 27.01.2020 to 10.02.2020. Five employee teams and one student team took part in the research. The student team was studying the management techniques course (a subject in the first year of the masters' studies "Film and television production" at Krzysztof Kieslowski Film School, the University of Silesia in Katowice).

The research method aimed at looking for the research question was a non-participant, structured observation together with the mobile application,

Team Motivator, as a research tool. Team Motivator was, at the same time, a management tool. The author of the paper was a moderator of the research.

Table 2.12. Dimensions, measured unit and a measuring scale – motivation

Dimension of the primary organizational term	Measured unit	Measuring scale
Check-up	Name of a check-up	Nominal scale (string of characters)
Period of a motivation diagnosis	Start day End day	Nominal scale (date)
Team member	Name of a team member	Nominal scale (string of characters)
Needs	Need 1: Up-to-now achievements Need 2: Skills and knowledge development Need 3: Responsibility for your life Need 4: Promotion Need 5: Regard Need 6: Prestige Need 7: Interaction with other people Need 8: Friendship Need 9: Love Need 10: Social security Need 11: Health and mental condition Need 12: Physical security Need 13: Shelter Need 14: Hunger Need 15: Sleep	Ordinal scale (from 0 to 5)
Proposed motivators	Motivator 1: Up-to-now achievements Motivator 2: Skills and knowledge development Motivator 3: Responsibility for your life Motivator 4: Promotion Motivator 5: Regard Motivator 6: Prestige Motivator 7: Interaction with other people Motivator 8: Friendship Motivator 9: Love Motivator 10: Social security Motivator 11: Health and mental condition Motivator 12: Physical security Motivator 13: Shelter Motivator 14: Hunger Motivator 15: Sleep	Nominal scale (string of characters)

The participants of the observation received a detailed plan of the observation, which included a quintuple measurement of two primary organizational terms (motivation and a motivating plan), instructions on how to use the Motivation Tools, and a detailed timetable of the measurement. In the paper, two measures of both primary organizational terms are presented, coming one after another of one person belonging to one of the employee teams and his team manager.

As was explained above, there were two primary organizational terms examined in the measurement, motivation, and a motivating plan. Both primary organizational terms were described by measured units, which were grouped in dimensions of organizational terms (Flak, 2010). In Table 2.12, there are dimensions of the primary organizational terms called motivation, its measured units, and types of a scale of measured units. By the same token, in Table 2.13 there are dimensions of the primary organizational terms called a motivating plan, its measured units, and types of a scale of measured units. As far as the primary organizational term called a motivating plan is concerned, it was assumed that this organizational term contains a countless number of dimensions called a motivation action. These dimensions are numbered from 1 to n.

Table 2.13. Dimensions, measured unit and a measuring scale – a motivating plan

Dimension of the primary organizational term	Measured unit	Measuring scale
Check-up	Name of a check-up	Nominal scale (string of characters)
Period of a motivating plan	Start day End day	Nominal scale (date)
Team manager	Name of a team manager	Nominal scale (string of characters)
Motivating action n	Start day End day	Nominal scale (date)
	Type of a motivating action	Nominal scale (individual, team)
	Content of a motivating action	Nominal scale (string of characters)

The mobile application, Team Motivator, was used as a measuring tool to record both primary organizational terms. From a functional point of view, Team Motivator can be installed on a mobile device with an Android or IOS operating system. It consists of a few modules such as a login module, a team-

motivation diagnosis module, a motivating plan module, a motivating actions monitor module, a module of team managers' behavior pattern recognition, and a module of team members' behavior pattern recognition.

The mobile application is a quite complex computer program that has the following special features. Firstly, the application allows a team manager to solve a sophisticated organizational problem (Jerzak, 1994). From the team management perspective, this problem consists of team-motivation diagnosis and a plan of motivating action at a certain time, which are an answer to the diagnosed motivation. Secondly, every user of the application can be in one of two roles – either a team manager or team member – in any number of teams at the same time. This solution is very flexible because once installed on a mobile device, the application makes it possible to either create a team and invite other team members who also have it installed or be invited to an existing team by any other user of the application. The number of teams and users belonging to the team is not limited.

Thirdly, the application does not store any data in the mobile device's memory. All the data are recorded in a database on a server, which makes it possible to use the application on different devices at the same time by the same user, create the next versions of the application and install them on a mobile without losing data gathered before. Finally, the application does not use any hardware components of a mobile device, such as a microphone, a camera) or any other installed applications, which makes Team Motivator very safe to use.

Due to the fact that the application helps a team manager to solve an organizational problem of both a motivation diagnosis and a motivating plan, Team Motivator consists of two parts:

- Motivation test – a diagnostic tool that uses the first primary organizational term – motivation – as a theoretical foundation (Table 2.12). A questionnaire with closed-end questions concerning Maslow's hierarchy of needs and open-end questions about proposed motivators that could meet these needs is a measuring tool;
- Motivating plan – a planning tool that uses the first primary organizational term – motivation – as a theoretical foundation (Table 2.13). A calendar was used as a planning tool because such a form is quite popular in mobile applications for time management. This calendar was embedded with a dedicated module of a motivating action description for a particular team member or all team members together.

A motivation test and a motivating plan are parts of a check-up, a diagnostic-planning unit, which is created by a team manager for a certain period of time.

In Figure 2.8, there are three screenshots of the application, which from the left show (1) a user manual with a procedure of using the application in order to solve an organizational problem, (2) an application menu after logging in and creating a team, and (3) a list of five check-ups for this team, including the fifth one, which is ready to edit.

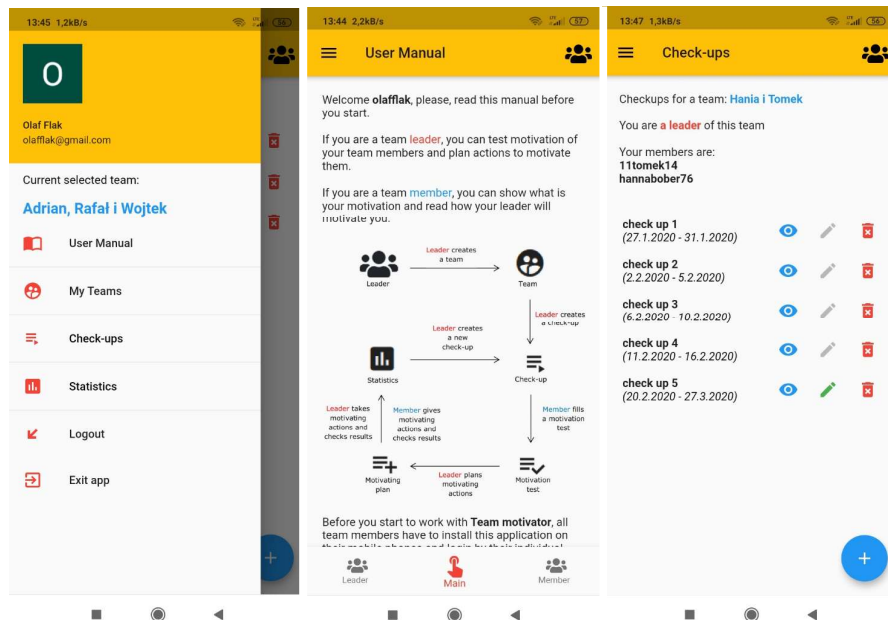


Figure 2.8. Application screenshots of (1) a user manual, (2) a main menu and (3) a list of check-ups

It should be emphasized that the diagnostic-planning unit – a check-up – is a basic object created by a team manager and it has a unique name and a certain period. The check-up consists of two subperiods: a motivation diagnosis period (primary organizational term – motivation) and a motivating plan period (primary organizational term – a motivating plan). This object-oriented approach allows a team manager to take managerial actions in a sequence of time, and analyze a decrease or an increase in team motivation as a result of a motivating plan, etc.

In Figure 2.9, we can see (1) a part of a screenshot of the Motivation test (for the primary organizational term called motivation) in the diagnostic-planning unit called “check-up 5,” which is to be filled in by the team members. As can be seen in Figure 2.9, the team members in the period from 20.02.2020 to 27.02.2020 were asked to answer the question: “What do you need now?” with respect to 15 needs in Maslow’s hierarchy of needs (in Figure 2.9, there are only two highest needs and the rest of the needs were available after scrolling down the screen). A team manager was able to turn the forms on and off. Team members could propose their best motivator (proposals of motivators), edit the name of the check-up (short name of the check-up), and set a period within

which the motivation test was valid (period of motivation test in this check-up) as well as edit the names of all the needs in Maslow's hierarchy.

Figure 2.9 also presents (2) a screenshot of a motivating plan for all team members (all members) in the period from 28.02.2020 to 27.03.2020. After clicking on a certain date, it is possible to create a motivating action for a single member or the whole team. This view is also available for team members.

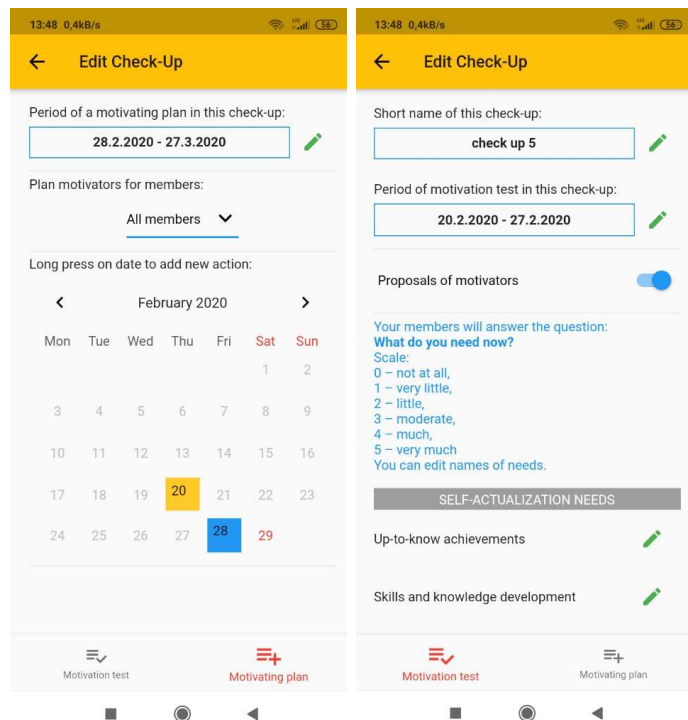


Figure 2.9. Application screenshots of (1) the motivation test and (2) the motivating plan

It is worth underlining that a team manager can edit any motivating actions in the motivating plan and a team member can see only those motivating actions that were planned by the manager for him. An opinion about the effects of these motivating actions can be expressed by a team member, not directly, but in the next motivation diagnosis in the next check-up. Then a team member assesses to what extent his needs were satisfied in the previous check-up and can write an appropriate proposal of motivators. This way, the data gathered in the following check-ups allows for the analysis of the behavior of a team manager and team members.

Every diagnostic-planning unit (a check-up) has another part as an analysis of the team manager and team members' activities in the field of team motivation, which is available in the statistics menu. This function in the application consists of two screens: the motivation test and the motivating plan. The statistics menu allows a user to distinguish a class of team member depending on the kind of needs that motivate him. There are three classes of team member after the motivation diagnosis: a basic-needs player, a social-needs player, a sophisticated-needs player. A team manager is also assessed in the application, depending on how he motivated a certain team member. A team manager can belong to one of four classes: focused and efficient, unfocused and efficient, focused and inefficient, unfocused, and inefficient. These classes are determined depending on the matching of motivational activities to the needs of a team member and the effect, i.e. whether these needs were met.

4. Results and discussion

As was mentioned in Section 3, the research consisted of five samples of both primary organizational terms measurement in every team. Taking into consideration the length of this paper, there are two measurements for both primary organizational terms of one member of one team and his team manager. The rest of the measurements for this team and the other teams were conducted in the same way and the results differ from each other only in terms of measured unit values.

Table 2.14 shows the results of the first measurement of the primary organizational term called motivation for a team member, and Table 2.15 contains a motivating plan made by a team manager for this team member after a motivation diagnosis of this team member.

It should be emphasized that some of the needs presented in Table 2.14 were not felt by this team member (their values of measured units were 0) and that this team member did not make any proposal of motivators to his team manager. In Table 2.15, however, there are two motivating actions planned by the team manager as an answer to the needs of the team member.

Table 2.14. Results of the first measurement of the primary organizational term called motivation

Dimension of the primary organizational term	Measured unit	Measuring scale
Check-up	Name of a check-up	check up 1
Period of a motivation diagnosis	Start day End day	27.01.2020 28.01.2020
Team member	Name of a team member	Hanna
Needs	Need 1: Up-to-now achievements	3
	Need 2: Skills and knowledge development	4
	Need 3: Responsibility for your life	0
	Need 4: Promotion	0
	Need 5: Regard	0
	Need 6: Prestige	0
	Need 7: Interaction with other people	3
	Need 8: Friendship	3
	Need 9: Love	3
	Need 10: Social security	0
	Need 11: Health and mental condition	4
	Need 12: Physical security	0
	Need 13: Shelter	0
	Need 14: Hunger	3
	Need 15: Sleep	3
Proposed motivators	Motivator 1: Up-to-now achievements	-
	Motivator 2: Skills and knowledge development	-
	Motivator 3: Responsibility for your life	-
	Motivator 4: Promotion	-
	Motivator 5: Regard	-
	Motivator 6: Prestige	-
	Motivator 7: Interaction with other people	-
	Motivator 8: Friendship	-
	Motivator 9: Love	-
	Motivator 10: Social security	-
	Motivator 11: Health and mental condition	-
	Motivator 12: Physical security	-
	Motivator 13: Shelter	-
	Motivator 14: Hunger	-
	Motivator 15: Sleep	-

Table 2.15. Results of the first measurement of the primary organizational term called a motivating plan

Dimension of the primary organizational term	Measured unit	Measuring scale
Check-up	Name of a check-up	check up 1
Period of a motivating plan	Start day	29.01.2020
	End day	31.01.2020
Team manager	Name of a team manager	Piotr
Motivating action 1	Start day	29.01.2020
	End day	29.01.2020
	Type of a motivating action	individual
	Content of a motivating action	Go home earlier – about 2.00 pm
Motivating action 2	Start day	31.01.2020
	End day	31.01.2020
	Type of a motivating action	individual
	Content of a motivating action	We have to talk about your promotion – tomorrow at 9.00 am

After the period of the first diagnostic-planning unit called “check-up 1” (27.01.2020 to 31.01.2020), a team manager created again the second diagnostic-planning unit called “check-up 1,” which was planned from 02.02.2020 to 05.02.2020. Table 2.16 presents the results of the second measurement of the primary organizational term called motivation for the same team member, while in Table 2.17, there is a motivating plan made by the team manager for this team member as a response to the motivation diagnosis.

In Table 2.16, it can be seen that the extent to which the needs of this team member were met is different from the one examined before and shown in Table 2.14. In this case, the team member again did not propose any motivators. In response to the second motivation diagnosis (a primary organizational term called motivation in Table 2.16), there is a motivating plan (Table 2.17) made by the team manager. This motivating plan consists of only one motivating action.

Table 2.16. Results of the second measurement of the primary organizational term called motivation

Dimension of the primary organizational term	Measured unit	Measuring scale
Check-up	Name of a check-up	check up 2
Period of a motivation diagnosis	Start day	02.02.2020
	End day	03.02.2020
Team member	Name of a team member	Hanna
Needs	Need 1: Up-to-now achievements	4
	Need 2: Skills and knowledge development	4
	Need 3: Responsibility for your life	3
	Need 4: Promotion	0
	Need 5: Regard	0
	Need 6: Prestige	1
	Need 7: Interaction with other people	1
	Need 8: Friendship	4
	Need 9: Love	4
	Need 10: Social security	1
	Need 11: Health and mental condition	5
	Need 12: Physical security	0
	Need 13: Shelter	0
	Need 14: Hunger	3
	Need 15: Sleep	3
Proposed motivators	Motivator 1: Up-to-now achievements	-
	Motivator 2: Skills and knowledge development	-
	Motivator 3: Responsibility for your life	-
	Motivator 4: Promotion	-
	Motivator 5: Regard	-
	Motivator 6: Prestige	-
	Motivator 7: Interaction with other people	-
	Motivator 8: Friendship	-
	Motivator 9: Love	-
	Motivator 10: Social security	-
	Motivator 11: Health and mental condition	-
	Motivator 12: Physical security	-
	Motivator 13: Shelter	-
	Motivator 14: Hunger	-
	Motivator 15: Sleep	-

In Figure 2.10, there is a chronological sequence of organizational terms that occurred in organizational reality. With the use of the mobile application, Team Motivator, the following primary organizational terms were measured: motivation 1.1. (Table 2.14), a motivating plan 1.1 (Table 2.15), motivation 1.2 (Table 2.16), a motivation plan 1.2 (Table 2.17).

Table 2.17. Results of the second measurement of the primary organizational term called a motivating plan

Dimension of the primary organizational term	Measured unit	Measuring scale
Check up	Name of a check up	check up 1
Period of a motivating plan	Start day	04.02.2020
	End day	05.02.2020
Team manager	Name of a team manager	Piotr
Motivating action 1	Start day	05.02.2020
	End day	05.02.2020
	Type of a motivating action	individual
	Content of a motivating action	Go skiing after lunch

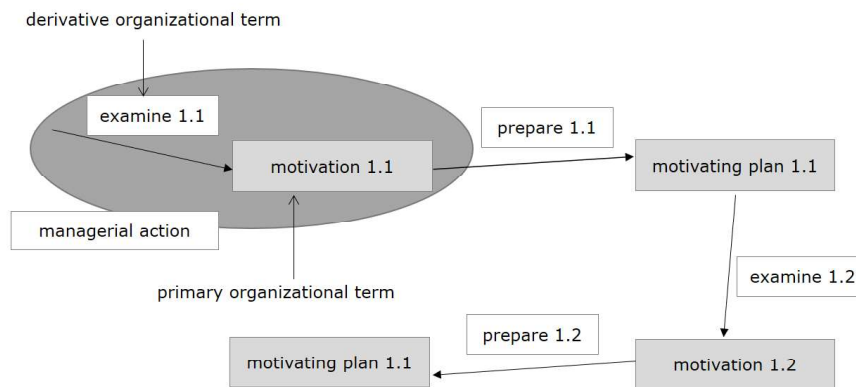


Figure 2.10. Real structure of managerial actions in the field of team motivation

Figure 2.10 displays the organizational terms that occurred in the field of team management of a given team, which show the real sequence of this process in the function of time. This is in keeping with the assumptions of the system of organizational terms as a methodological concept in management science, which was shown in Figure 2.7 and described in Section 2. It is necessary to underline that the measurement concerned only primary organizational terms (which was the fact of the class, in other words – the resources in an organizational approach). As for derivative organizational terms (which was the fact of the event class, in other words – the processes in an organizational approach), it is possible to infer their occurrence on the basis of the fact that the primary organizational terms occurred (Flak, 2018).

5. Conclusions

The results of the research on the Team Motivator users are the basis for a few conclusions. Firstly, the system of organizational terms as a methodological concept in management science can be a theoretical foundation for recording managers' activities in the field of team management. The research has proven such a possibility. The recorded primary organizational terms – motivation and a motivating plan – make it possible to represent the managers' activities and the team members' activities in the function of time, which was presented in Figure 2.10.

All the recorded primary organizational terms can be described by the measured units presented in Tables 2.14, 2.15, 2.16, 2.17. Changes in these measured units also allow making conclusions on derivative organizational terms (examine and prepare, respectively, to motivation and a motivating plan), which appeared in organizational reality during team management. It should be emphasized that it was the first time when the system of organizational terms was used to record managerial activities in the field of team motivation by a mobile application. In the author's previous research (Flak, Hoffmann-Burdzińska, & Yang, 2018; Flak, Yang, & Grzegorzek, 2017), the system of organizational terms was used to design online management tools available by an Internet browser.

Secondly, despite the fact that in Section 4, the results of only two measurements for primary organizational terms of one team manager and one team member were described, it is worth underlining that in the period from 27.01.2020 to 10.02.2020, 12 primary organizational terms called motivation were recorded as well as 12 primary organizational terms called a motivating plan. These results allow conclusions to be drawn on the number and sequence of the organizational terms, and on the meaning of them. This is possible thanks to the measured units, which recorded phenomena on a nominal scale as a string of characters. However, the analysis of these correlations, for example, which motivating action satisfied a particular need, is far beyond human perception. In order to draw such conclusions, it would be necessary to use machine learning and pattern recognition techniques. This would make the introduction of team management automation possible to a greater extent. However, it would need a much larger amount of data gathered by the mobile application, Team Motivator, coming from a long time of using this tool by the team manager and his team members.

Thirdly, in reference to the above-mentioned challenge and taking into consideration the main aim of the author's scientific efforts, which is team management automation, it is necessary to design and implement the n number of similar mobile applications. This would be useful in solving day-to-day

organizational problems in a company and would be used by team managers and their team members. At the same time, these management tools will be based on the m number of primary organizational terms. As this paper was being finished, another mobile application was about to be completed. Its theoretical foundation was a primary organizational term called decision.

We can assume that a team manager and his team working with the n number of mobile applications of this kind enables doing the k number of measurements of the m number of primary organizational terms in the function of time. The k -parameter depends on the frequency of using every one of these mobile applications by the team managers and their team members.

The results of the research described in the paper suggest that data gathered in this way will allow the recognition of (1) the types of team management process (content domain), (2) a sequence of these team management processes (time domain), and (3) the psychosocial characteristics of a team manager and his team members corresponding to particular team management processes (psychosocial domain) (Flak, 2020). It will allow building knowledge on the managerial activities, which would make it possible to use certain strategies of imitating human managers (Breazeal, 2003) and replacing them in certain situations with robots.

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Olaf Flak graduated in Management from the University of Economics in Katowice, and Electronics from the Silesian University of Technology in Gliwice, Poland. He got a Ph.D. in Economy in 2006, and in 2019, he got a degree of habilitation in Management Science. He is a Deputy Dean for International Affairs and Organization at the Radio and Television Faculty – University of Silesia and an Associate Professor at the University of Silesia. From 2002–2010, he was an Assistant Professor at the University of Economics in Katowice in the Faculty of Management. He is a scientist and a specialist in business management, a trainer, and a business consultant. His research area is investigating how automatic pattern recognition techniques can be applied in the management of science. He has managed several

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