MANAGERIAL TOOLS' INFLUENCE ON A PLANNING PROCESS. RESULTS OF THE EXPERIMENT

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Abstract

The main aim of the paper is to present the results of the experiment on the impact of management tools for the process of planning. It includes the theoretical foundations on the work of a manager using organizational techniques with the use of management tools to solve an organizational problem. Presented theoretical foundations are an introduction to test hypotheses which were verified with quantitative and qualitative data of an experiment in conjunction with non-participant observation. Analysis of these data enabled the authors to claim that the characteristics of managerial tools affect both the course of the organizational techniques, as well as the content of the solutions for the organizational problem.

Keywords: *project planning, managerial tool, management technique, system of organizational terms.*

1. Introduction

The idea how organizations perform changed during last decades from the view in the traditional organization theory (Scott, 1961) to interdisciplinary approach to organizations (Cummings & Kiesler, 2014) and combinations of narratives and analysis in explanation of organizations (Rowlinson, Hassard & Decker, 2014). However, there is still some cognitive gap in relations of main terms widely used in different approaches to organizations: the organizational technique, the organizational problem, and the managerial tool. The gap appeared concerning the influence of the last element – the managerial tool – on a way of work of a manager and using a proper organizational technique by this manager to solve the organizational problem. We can state the following research problem, which is claimed in a general research question: in what way does a managerial tool influence the process of using a particular organizational technique by a manager? The summary of the first theoretical

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background in the research which is the organization theory was described in Section 2.

The aim of the paper is to solve the research problem and answer the research question mentioned above, however, the conclusions of the research were planned to be valid only in relation to the group of participants of the research. According to the research problem there are two hypotheses posed by authors:

- H1. Features of a managerial tool do not influence a process of an organizational technique used by a manager.
- H2. Features of a managerial tool do not influence the content of a solution for an organizational problem.

The hypotheses and the effect of their verification were also planned to be valid only in relation to the group of participants of the research. Research methods used for the elaboration were an experiment and a non-participant observation. Research tools – online managerial tools – were prepared accordingly to the idea of the system of organizational terms (Flak, 2013b). This concept was the second theoretical background of the research, and it was presented in section 3. This paper contains:

- the view of an organization based on some elements of the traditional organization theory, such as the organizational technique, the organizational problem, and the managerial tool,
- the system of organizational terms as a methodological frame in recording organization performance,
- methods of research conducted to verify hypotheses presented above,
- quantitative and qualitative results of two experiments which allowed to verify the hypothesis H1 and hypothesis H2,
- further directions of research dealing with the use of managerial tools in organizational techniques.

2. Organization theory as the first background of the research

In the traditional approach, the organization is viewed as "a vehicle for accomplishing goals and objectives" (Scott, 1961, p. 7). In this meaning, this is the place where the human cooperation appears. There are four pillars of this approach: a division of labor, scalar and functional processes, a structure and a span of control (Scott, 1961, pp. 9-10). The next view of the organization added the superior position in the organization of a man who would have knowledge and techniques of acting on behalf of the organization in some way making organizations operating in the environment (Thomson, 1961, pp. 12-13). The role of managers and members of the organization were widely stressed in the next works on organization theory (Gibson, 1966, pp. 244-245).

The vision of the organization changed gradually, and a few years later the need for the organization theory development appeared. This need enhanced with several dimensions such as a rising role of group processes, meaning of organizational community, abstract and relative values instead of absolute ones, efficacy of planning, meaning of leadership (Scott, 1974, pp. 249-250). Just after this change, other assumptions appeared in the organization theory. Firstly, it was remarked that managers use different methods to obtain similar objectives, despite the fact there might be some similarities in management styles. Secondly, authors emphasized the role of objective measures in making managerial decisions. Thirdly, methods of managing were claimed to be adjusted to the social aspects of organizations (Negandhi, 1975, pp. 334-335). It is worth adding that in the next decades, many changes in the organization theory appeared, especially the narrative approach and adequate research methods (Czerniawska-Joerges, 1997). They gave a foundation of conclusions that the boundaries between material and immaterial aspects of organizations could not be maintained in the organization theory anymore (Washbourne & Dicke, 2001, p. 107). In the recent years, new approaches were created. They tried to recognize how to develop organization theory, by a discussion between theorizing top-down vs. bottom-up theorizing (Shepherd & Sutcliffe, 2011) and theorizing within one literature or across multiple bodies of literature vs. theorizing with implicit assumptions or explicit constructs in the focal publications (Suddaby, Hardy & Huy, 2011). Also, it was tried by an interdisciplinary approach to organizations (Cummings & Kiesler, 2014, pp. 11), and combinations of narratives and analysis in explanation of organizations (Rowlinson et al., 2014, pp. 252-260).

Moving back to the essence of the organization performance, it is worth saying that the central part of organization performance is an activity of people inside the organization (Popper, 1997, p. 101). Popper (1997, p. 101) remarks that we could not even say that the organizations "perform" themselves. This statement was a fundamental assumption in conceptualization in this research. As Negandhi (1975) claimed and Szarucki (2013, p. 171) reminded, functioning of organizations can be characterized by a description of organizational methods or techniques used by a human (the term "organizational techniques" will be used in a further part of the paper). The traditional approach to the organization gave a possibility of conceptualization the connection between the organizations and people activity within organizations. In this approach, organizational techniques usually have strictly specified procedures that have to be used in solving problems in an organization (Jerzak, 1994, p. 91). A general idea of a problem can be defined as a deviation between the state „what should be" and the situation „what is in reality" (Kepnera & Tregoe, 1965, p. 18). Referring to this definition, the organizational problem is a task

aimed at establishing possible optimal ways of acting in a particular situation in an organization (Mikołajczyk, 1973, p. 159). The literature presents a testimony that one of the most important ways of solving organizational problems is using instruments (Piłejko, 1976, p. 181). In management science, an instrument is defined as a tool or an appliance to do some action (Pszczołowski, 1978, p. 85). Thus, such an instrument – managerial tool – is in some way detached from a manager, his predispositions, and skills of using organizational techniques. An administrative managerial tool is an algorithmic and certain way of realization management functions, possible to be used by any manager (Flak, 2013a, p. 195). Of course, there are some restrictions and constraints of managers behavior described by Giddens (1979), such as interpretive schemes, mutual knowledge, dependence on social interaction (Giddens, 1979, pp. 83-96). However, these factors were not researched, and they were taken as similar in the group of the research.

3. The system of organizational terms as the second background of the research

The system of organizational terms is a methodological idea in management science which was projected to record the organization performance using the observation technique along with management tools as research tools. The concept was created by Flak (2007, 2008) with the conceptualization of the organizational reality, then other elements of the system have been created, such as definitions of organizational terms (Flak, 2009) and methods of gathering data about the organization performance (Flak, 2010).

The system of organizational terms is based on a few key assumptions. Firstly, as it was mentioned in the introduction, organizations perform by organizational techniques used by a manager and members of an organization for organizational problem solving. Using organizational managerial techniques is connected with using an appropriate managerial tool (Flak, 2013a).

Secondly, the ontology of organizational environment consists of elements typical for the case of ontology development (Staab & Studer, 2009, pp. 2-8). The definition of this ontology is as follows. The elements of the universe of the organizational environment described by the system of organizational terms: D = {factT1, factT2, factT3, …, factE1, factE2, factE3, …}

The elements of the ontology are facts. The abbreviation “T” means it is a thing, and “E” indicates events. Counting facts by numbers is possible. Facts appear within time. Their increasing values are not constrained by any number. The set of relations on D is as follows: R = {name of factT1, name of

factT2, name of factT3, …, name of factE1, name of factE2, name of factE3, …, creates, starts} (Flak, 2013b).

Thirdly, the epistemology uses a merger of a quantitative and qualitative approach that leads to using a mixed-method in research on organizational reality (Symonds & Gorard, 2010, p. 121). A research method in the system of organizational terms ought to assure a rationality in cognition by indirect reference to a subject of cognition, indeed the thing that is a sense of the subject (Heller, 2009, p. 114). There is an observation used in the system of organizational terms. However, it is applied in a slightly wider meaning than this is understood in social sciences (Little, 1993).

Fourthly, the measuring tool in the system of organizational terms is a managerial tool used within the organizational technique to solve an organizational problem. The idea of a managerial tool in the system of organizational terms is based on an assumption that management means creating "things" in an efficient (Kotarbiński, 1969, pp. 127-141) and effective (Kotarbiński, 1969, pp. 113-116) way. In original "Managing is about getting things done" (Chopraa & Gopal, 2011, p. 63). The idea is also fostered by an idea of a behavioral unit;that is consistent behavior lasting any time, perceived as an activity of a person or a group. A behavioral unit has its beginning and ending, and concrete meaning in the particular context of actions (Hatfield & Weider-Hatfield, 1978, pp. 44-50).

Finally, the system of organizational terms belongs to the systemic approach (Bertalanffy, 1950, pp. 134-165) and is based on rules of concluding, which origins from a formal logic (Crane, 2012, p. 31).

As it was presented above, the system of organizational terms is a methodological framework for conducting research in the area of organization performance by recording managers behavior who use organizational techniques to solve the organizational problem with the managerial tool.

4. Methodology of the research

The system of organizational terms presented above was a basis of the methodology of the research and a premise to use online management tools as research tools during the observation of managers' work. There were two research methods used: an experiment and a non-participant observation, with the experiment as the main method used by the researchers.

The experiment was organized in two stages: in November 2015 and March 2016. In both cases, participants of the research were students of management at one of the Silesian universities. They were challenged by a real organizational problem that was teamwork planning on bachelor's thesis. We have to mention that preparing bachelor's theses in groups is a quite new

and original approach to organizing studies, and it can be acknowledged as a special one. On the first stage of the experiment, there were 10 groups and on the second – 6 groups. The result achieved by a group was treated as an effect of work performed by a single manager. This was reasonable from the point of view of research objectives and did not influence on the verification of the hypotheses.

Groups taking part in the experiment got the same organizational problem to solve with the use of two organizational techniques – technique of setting goals (1) and technique of creating tasks (2) – with online managerial tools corresponding with them – the Goaler (1) and the Tasker (2). The researcher gave the following instruction: "Prepare a plan consisted of goals and tasks, which will allow you to prepare your team project (bachelor theses)".

Every phase of the experiment consisted of two stages and two general types of management tools – empty sheets of paper (A) and online management tools (B). Although treating empty sheets of paper as a managerial tool could raise doubts, it fulfills assumptions of a managerial tool's definition's presented in an introduction. Blank sheets of paper have a feature that causes a zero measurement error as a consequence of so-called bias influence (Olson, 2006). The feature means that a tool in a form of empty sheets of paper is simply clear (not written). Thus, we can assume that its influence on a manager is always the same taking into consideration a graphical form (content structure, suggested actions, managing attention, etc.). Additionally, the influence is the same in the case of organizational techniques used in the experiment, because empty sheets of paper are equally an appropriate tool for setting goals and creating tasks.

In the case of 10 groups participating on the first stage of the experiment, at start managers had to plan their work on empty sheets of paper, and when they finished, they planned projects using online management tools (the Goaler and the Tasker described above). Six groups from the second stage of the experiment worked in reversed order of using a particular managerial tool. First, they planned using online managerial tools and then they did the same on empty sheets of paper. Both stages of the experiment were done during the 2-hour sessions (120 minutes).

In the experiment, the researcher used a non-participant observation because all actions of students were registered by managerial tools (empty sheets of paper, the Goaler and the Tasker). Hereby, one of the main assumptions of the system of organizational terms was executed. It states that managerial tools are simultaneously measurement tools. There was a survey conducted after the first stage of the experiment. Results of the second stage of the experiments were discussed with participants. Information gathered in

this way was very helpful in formulating ending conclusions and verifying the hypotheses.

Although the participants of the research were students of management, in order to keep a consistent vocabulary referring the quantitative and qualitative results of the research in the Section the leaders of groups of students were named as managers. The authors of the paper are conscious that this is a kind of a metaphor – the students were not real managers in companies – despite this, the authors assumed that they acted in the small teams as in small organizations using common organizational techniques and management tools.

Because main measurement tools were the Goaler and the Tasker, this is necessary to explain their functionality and other features. The management tools used in the research have following features:

- they split a process of management into small parts, according to the idea of a "unit of behavior" (Curtis, Kellner & Over, 1992),
- a result of using management tools is an object that is an effect of a management process (Flak, 2013a),
- a possibility of registering organizational resources as results of processes conducted within the organization (Glykas, 2011, p. 11).

According to these rules, the form of the Goaler consists of several features of the goal. A manager who used the Goaler could describe a goal as presented in Table 1.

Table 1. Features of goals in the Goaler

Features of a goal	**A way of description**
A vision of the future:	Form – 300 characters
A short name of the goal:	Form – 60 characters
The period or date:	Buttons and lists of options
Measurers x 10:	Form – 300 characters
Is the goal real to achieve?	List of options: {choose, yes, mostly yes, partly, mostly no, no}
Does the goal belong to your duties?	List of options: {choose, yes, mostly yes, partly, mostly no, no}
Create the goal based on green box details:	Form – 480 characters
The goal is in the field of:	List of options: {choose, finance, human resources, logistic, management, marketing, products, and services}
The goal is:	List of options: {shortterm, longterm}
The goal belongs to:	List of options: {strategy, operation}
The goal is valid:	List of options: {always, occasionally}
The goal concerns:	List of options: {one person, a group of people}

Tasks can be described by several features, such as time intervals i.e. days, weeks or months, doers of tasks, the way of tasks performance, etc. The form of the Tasker consists of several features of the tasks described in Table 2.

Table 2. Features of a task in the Tasker

Features of a task	A way of description
A short name of the task:	Form – 60 characters
To which goal the task belongs:	List of options: dynamic list of names of goals
A verb what is to do:	Form – 120 characters
Names who is to do this (x9):	Form – 60 characters
How long does it take:	Lists of options
Add details how to do this:	Form – 120 letters
Add details where to do this:	Form – 120 letters
The task is in the field of:	List of options: {choose, finance, human resources, logistic, management, marketing, products, and services}
The task is:	List of options: {choose, important, quite important, not important}
The task is:	List of options: {choose, urgent, quite urgent, not urgent}
The task appeared:	List of options: {suddenly, expected}
The task belongs to:	List of options: {strategy, operations}

The examples of prototypes of such tools are available at transistorshead.com. The tools are original and based on the system of organizational terms designed by Olaf Flak. There is a possibility of testing such tools at transistorshead.com. The first account (to see how a manager used the tools) – login name: john.smith, password: smith. The second account (to create goals and tasks) – login name: anonymous.manager, password: manager.

5. Quantitative results of the research

Results of the non-participant observation done with online managerial tools, according to the research method presented the Section 4, allowed to collect data on a process of organizational techniques used by a manager. These techniques deal with the setting of goals (1) and tasks (2), where the Goaler (1) and the Tasker (2) were used appropriately. Particular actions within managerial techniques were registered, e.g., goal setting, its editions or deleting it from the list of goals.

Table 3 contains quantitative parameters of using managerial techniques by 10 managers on the first stage of the experiment, and Table 4 presents the results of planning delivered by six managers on the second stage of the experiment. Table 3 shows mean values of parameters on both stages of the experiments. It is important to emphasize that the stages of the experiment were indeed two separate experiments conducted among different groups of students.

Table 3. Quantitative findings. Firstly – on sheets of paper (X) and, secondly – using online managerial tools (Y)

		Managers									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
No.		**Measures**									
A	duration of teamwork (minutes)	81	64	57	47	52	64	53	58	37	57
B	number of goals	7	10	2	1	2	2	4	1	1	2
C	number of tasks	18	18	14	6	12	7	15	13	8	9
D	number of created objects (goals and tasks)	25	28	16	7	14	9	19	14	9	11
E	number of actions	124	41	40	27	40	53	21	44	22	45
F	number of created objects (goals and tasks) per minute	0.30	0.43	0.28	0.14	0.26	0.14	0.35	0.24	0.24	0.19
G	number of actions per minute	1.53	0.64	0.70	0.57	0.76	0.82	0.39	0.75	0.59	0.78
H	number of goals editions	13	1	0	0	0	2	0	4	0	0
I	number of tasks editions	7	7	2	5	3	2	2	2	0	0
J	number of editions by object (goal)	1.85	0.10	0	0	0	1.00	0	4.00	0	0
K	number of editions by object (task)	0.38	0.38	0.14	0.83	0.25	0.28	0.13	0.15	0	0

In the scenario of managers using empty sheets of paper (X) first and then online managerial tools (Y), despite the fact that duration time of an experiment was limited (120 minutes), managers used it in different proportions working on a project planning. The longest login to managerial tools took 81 minutes, the shortest one only 37 minutes. The number of minutes influenced the number of actions done by managers on the second stage of this phase. Generally, the more minutes a manager spent with the tools, the more actions he created (i.e. created more goals and tasks, checked if they are correct, tested the functionality of tools, etc.). The interesting finding is that all managers were given the same project to describe by tasks and goals. Despite this fact, they chose completely different ways of doing it.

There were also big differences in a number of goals and tasks created by each manager. The exact numbers are shown in parameters B and C of Table 1. In this area, there are also differences to be seen in the managers' approach to planning. Some managers created a few goals and many tasks (such as the third manager – 7 tasks per 1 goal). The others chose another proportion of goals and tasks – 7 to 18 (the first manager) or 2 to 9 (the tenth manager). However, there are no dominant rules of proportions between goals and tasks.

As we can see in parameter G (Table 3), the fastest in planning was the first manager. The slowest planning process was the seventh manager. His speed was a quarter of the first manager's speed. What is more interesting, slow-planning managers (the seventh and the fourth ones) did not edit their goals. They tried to create accurate objects at once.

A comparison of goals' and tasks' numbers of the edition is surprising. Goals were edited only by four managers and the tasks were edited by eight managers. Only two managers were focused on setting goals and establishing tasks without correcting them in any way. On the contrary, the tasks were edited many times by twice as much of managers compared to the editing of the goals (comparison of the parameters J and K).

As it was presented in Table 3, among a group of 10 managers there was no dominant, quantitative route of project planning. Nevertheless, there are some similarities in the numbers of goals and tasks, in the speed of planning or an approach to divide issues into goals and tasks.

Table 4. Quantitative findings. Firstly – using online managerial tools (Y) and, secondly – on sheets of paper (X)

		Managers					
		1	**2**	**3**	**4**	**5**	**6**
No.	**Measures**						
A	duration of teamwork (minutes)	15	59	24	23	49	34
B	number of goals	2	3	1	1	1	2
C	number of tasks	9	11	8	5	8	5
D	number of created objects (goals and tasks)	11	14	9	6	9	7
E	number of actions	26	84	29	32	21	37
F	number of created objects (goals and tasks) per minute	0.73	0.24	0.38	0.26	0.18	0.21
G	number of actions per minute	1.73	1.42	1.21	1.39	0.43	1.09
H	number of goals editions	2	1	0	0	0	1
I	number of tasks editions	2	10	5	5	0	2
J	number of editions by object (goal)	1.00	0.33	0.00	0.00	0.00	0.50
K	number of editions by object (task)	0.22	0.91	0.63	1.00	0.00	0.40

As it was presented in Table 4, in the scenario in which the managers in the beginning used online managerial tools (Y), and later on empty sheets of paper (X), results of their work were very different. The time of work with online tools (from login to logout) also was different within this particular group – the shortest time was 15 minutes and the longest was 59 minutes – but many goals created in the Goaler were congenial and very low. Three managers created only one goal, and two other managers created two goals. The number of tasks that were created within particular goals was more

various. Only manager 2 set a number of 11 tasks, what is easy to explain because he formed three goals.

As we can see in parameter G (Table 4), the fastest in planning was the first manager – he did 1,73 actions per minute. The slowest planning process can be observed in the case of the fifth manager – only 0,43 actions per minute. In Table 4 we can see that an edition of goals was done only by three among six managers. This means that three of respondents with no doubts set the goal and were working on tasks' creation. It is interesting that the tasks were edited by five managers, and only one did not correct his tasks.

By the analysis of the research results (Table 4) we can conclude that on the second stage of the experiment, there was not any dominant way of project planning, very similar to the first stage of the experiment. Additionally, it was difficult to find some obvious similarities in using organizational techniques by managers and identify general rules of proceeding.

Table 5 presents a comparison of quantitative findings between first and second stage of the experiment.

Table 5 contains mean values of parameters describing activities of managers using online managerial tools during both stages of the experiment. Although, these are means, differences in the use of organizational techniques with managerial tools as the Goaler and the Tasker (Y) are significant depending on the use of tools before or after planning on empty sheets of paper (X).

As a first point (parameter A), managers were working with online managerial tools (Y) 67% longer, when before that they had set goals and tasks on empty sheets of paper (X), thus, when they had had more information on conditions of a project.

Secondly, a number of goals and tasks, in the case of having a "paper" version of a plan (X), was twice higher than in the situation of starting planning from using online managerial tools (Y).

Thirdly, working on the second stage of the experiment with online managerial tools (Y) using organizational techniques was much faster than in the case of having an initial version of a plan on empty sheets of paper (X). The Speed of using organizational techniques is described by two parameters: the number of created objects (goals and tasks) per minute and the number of actions per minute.

Table 5. Quantitative findings. Comparison between 1st and 2nd phase of the experiment

		Mean values of parameters in:	
		the first stage of the experiment – starting with empty sheets of paper (X), and later planning with online managerial tools (Y)	**the second stage of the experiment – starting with online managerial tools (Y), and later planning on empty sheets of paper (X)**
No.		**Measures**	
A	duration of teamwork (minutes)	57.00	34.00
B	number of goals	3.20	1.67
C	number of tasks	12.00	7.67
D	number of created objects (goals and tasks)	15.20	9.33
E	number of actions	45.70	38.17
F	number of created objects (goals and tasks) per minute	0.26	0.33
G	number of actions per minute	0.75	1.21
H	number of goals editions	2.00	0.67
I	number of tasks editions	3.00	4.00
J	number of editions by object (goal)	0.70	0.31
K	number of editions by object (task)	0.25	0.53

The number of created objects (goals and tasks) per minute is accordingly 0.26 items (first stage of the experiment) and 0.33 items (second stage of the experiment). However, the number of actions per minute is respectively 0.75 and 1.21 items. This means that managers without drafts of plans created on empty sheets of paper (X) acted much faster using organizational techniques and online managerial tools (Y) than in the case of using both kinds of tools (X and Y) in reversed order. This is quite striking, especially that online managerial tools (Y) for respondents were something new, and the way of using them, in the beginning, requires some time for reflection.

Fourthly, the number of goals' and tasks' editions was inversely depending on the stage of the experiment. Managers corrected goals in the Goaler (Y) in the case of having paper drafts of plans (X) more often than when filling in goals in the Goaler (Y) was done at first. However, in the case of tasks the dependence was inverse. Detailed values showing the phenomena are parameters H, I, J, K in Table 5.

6. Qualitative results of the research

Managers prepared their project plan. Results of their work were analyzed as describing goals and tasks by the participants of the experiment. Firstly, for all cases, it was checked if the work results were different or similar in paper and online version. Secondly, the effects of work done by two managers were selected for further analysis. For this matter, the authors once selected managers who prepared the most similar versions of project plans and once managers who created the most different versions.

Table 6. The most different versions of the project (manager 5 in Table 3)

Version X (plan on the paper sheets)	**Version Y (goals and tasks saved in online tools)**
Goal 1: not written	**Goal 1: Writing and defending the bachelor's thesis**
Tasks to achieve the goal 1: **1. Choosing the subject of the project** 2. Delegating tasks and duties 3. Planning the structure of the project **4. Formulating a hypothesis** **5. Giving tasks to group members in the first stage of work** 6. Collecting materials 7. Closing the first stage of the project 8. Starting the second stage of the project 9. Constructing a questionnaire **10. Conducting a survey** 11. Conducting interviews 12. Collecting results **13. Describing results** 14. Closing the second stage of the project 15. Starting the third stage of the project **16. Collecting literature for the case study** 17. "Own" summary of the project **18. Giving the text to the promoter** 19. Correction of the text 20. Making a PowerPoint presentation 21. Closing the project and appearing on the exam	Tasks to achieve the goal 1: **1. Choosing the subject of the project** – select the subject according to interests of the group **2. Formulating a hypothesis** **3. Tasks division on the first stage of work** 4. Preparing a survey and **conducting research, elaborating results** and creating charts **5. Designing a case study – gather information from the literature** and the interview with coach 6. Thesis defending – **giving the text to promoter** and pass the exam on 4,5 or 5 grade

The Tables 6, 7, 8 and nine present the content recorded by online tools (the first stage) and notes made by those managers (the second version of both stages of the experiment).

As it was mentioned above the authors conducted the first and the second stage of the experiment. The first stage of the research brought the following conclusions concerning the most different version of the plan (Table 6).

In the first version of the task within the first stage of the experiment, the manager 5 wrote a lot of tasks (21 items) and not one goal on the sheet of paper. Tasks presented in a very detailed way show what has to be done in the project. In the second version (online managerial tools) the manager set one goal and six tasks which were means to achieve the goal. The most similar version of the project in the first experiment is presented hereinafter in Table 5.

Table 7. The most similar versions of the project (manager 4 in Table 3)

Version X **(plan on the paper sheets)**	**Version Y** **(goals and tasks saved in online tools)**
Goal 1: Writing and defending the bachelor's project	**Goal 1: Writing the bachelor's project**
Tasks to achieve the goal 1: **1. Preparing** **a) meeting and choosing the subject** b) allocation of duties **c) collecting materials** **2. Writing** a) Stage 1: - familiarization with materials - analysis and selection materials and methods b) Stage 2 **- table of content** **- preparing a bibliography** - chapter I (theoretical) - chapter II (**research): projecting research, conducting it, analysis of its results and conclusions** c) Stage 3 – summary **3. Promotor's acceptance of the project's content** 4. Defending the project	Tasks to achieve the goal 1: **1. Preparing – meeting and choosing the subject** **2. Collecting materials** **3. Writing – table of content** **4. Writing – bibliography** 5. Individual interviews with employees of the examined organization **6. Research results' analysis – preparing charts and description of results** **7. Conclusions –** linking the theory with research results and conclusions
Goal 2: not written	**Goal 2: Defending the bachelor's project**
Tasks to achieve the goal 2: not written	Tasks to achieve the goal 2: **1. Promotor's acceptance** – sending the whole elaboration 2. Learning – preparing a presentation and learning for the final exam

The similarity of both project versions concerns more the content of projects than its structure. It is very well shown that the structure of the projects is slightly different in the presented versions. There are aspects of both versions of the project which were difficult to compare.

For the second stage of the experiment, in which the order of planning versions was reversed, the most different versions of plans selected from all groups are presented below (Table 8).

Table 8. The most different versions of the project (manager 4 in Table 4)

Version X **(goals and tasks saved in online tools)**	**Version Y** **(plan on the paper sheets)**
Goal 1: Bachelor's thesis Criteria: **choosing the topic, gathering materials** and creating the table of content, **tasks assignment, closing the semester and passing exams, passing the seminar classes**	Goal 1: Writing and defending the bachelor's thesis Criteria (miles stones): **choosing the topic, gathering materials, work assignment**, **closing the semester** and passing exams, **passing the seminar classes**, thesis defending
Tasks to achieve the goal 1: **1. Chapter I** – meritorical issues; detailed bibliography; assumptions and **theses** within the project **2. Chapter II – empirical part**; conducting research in an organization and an analysis of data gathered in an organization. **3. Chapter III** – conclusions; **defending** theses from Chapter I **4. Summary**; summary of theses and defending them. **5. Learning** the thesis	Tasks to achieve the goal 1: **1. Chapter I** – formulating **theses** **2. Chapter II – empirical part** **3. Chapter III** – defending and confirming theses 4. Introduction and **summary** **5. Learning** (preparing for the final exam)

The versions prepared by the managers in the second stage of the experiment seem to be more similar to each other. Nevertheless, with a view to the case intensity, it is to be seen that version X (planning with online tools) is more detailed. Version Y is more synthetic and does not contain all information on the issue. Furthermore, there is a difference in the names of goals set in the project. We can say that the structure of both plans is similar, but the content differs in details.

In the second stage of the experiment, manager 2 prepared the most similar versions of the project. The results of this work are presented in Table 9.

The versions of the project presented in Table 9 are very similar. Not only the content is almost the same, but also the words used by the manager to describe goals and tasks. Both versions display a high level of complexity and detail.

Table 9. The most similar versions of the project (manager 2 in Table 4)

Version X (Goaler and Tasker)	**Version Y (paper sheets)**
Goal 1: **Preparation for bachelor's thesis writing**	Goal 1: **Preparation for bachelor's thesis writing**
Tasks to achieve the goal 1: **1. Recruiting group members** **2. Choosing as subject** **3. Choosing a promoter**	Tasks to achieve the goal 1: **1. Choosing a promoter** **2. Recruiting group members** **3. Choosing a subject**
Goal 2: Writing bachelor's thesis 70 pages in length	Goal 2: Writing bachelor's thesis
Tasks to achieve the goal 2: 1. Choosing and according to the subject with a promoter **2. Tasks' division among group members** **3. Writing an introduction** **4. Text** **5. Research** **6. Summary** **7. Thesis setting**	Tasks to achieve the goal 2: **1. Tasks' division among group members** 2. Gathering materials **3. Writing an introduction** **4. Text** **5. Research** **6. Summary** and conclusions **7. Thesis setting** **8. Presentation**
Goal 3: **Defending thesis** Getting the diploma	Goal 3: **Defending the bachelor's project**
Tasks to achieve the goal 3: **1. Preparing for a thesis defending** **2. Defending the thesis**	Tasks to achieve the goal 3: **1. Learning for a thesis defending** **2. Defending the thesis** and celebration

The qualitative analysis of the material gathered from two experiments allows to see that planning projects by managers within each stage of the research (the first and the second stage of the experiment) has some specific features. All managers more or less precisely planned their projects, but in the first stage of the experiment, the versions of plans (on the paper and using online tools) were more different from each other. Managers were more creative writing plans on paper sheets than planning with the Goaler and the Tasker. In the second stage of the experiment, all managers prepared quite similar versions of plans. In this case, they started with online tools and afterward planned their projects on paper sheets. The most similar versions of the project were not challenging to identify, but the most different versions of the project were more difficult to choose. Facing the most similar versions of the projects in both stages of the experiment, we/you can see that in the second one the manager achieved an almost perfect projection of his plan. The most different versions in both stages are very different from each other considering the elements which were mentioned as differences.

The results of the work generated during experiments and the in-depth analysis of them led to a general conclusion that the order of preparing versions of the projects matters and has an influence on managers in the process of planning.

7. Conclusions

The primary goal of the paper was to prove or disprove two hypotheses presented in the introduction. Their verification is not valid for all cases of the examined phenomena. However, the results of the audit consider only the group of the participant who took part in the experiment.

In the paper authors also presented theoretical frames of the research: view of the organization performance based on the traditional organization theory and the system of organizational terms as a methodological concept in management sciences. The data in the research was gathered by using a mixed-method in research mainly through the non-participant observation conducted with managerial tools that were measurement tools, and also by the means of a survey.

Based on the quantitative results of the experiment described in Section 5, it can be assumed that the hypothesis H1 is false. The features of the managerial tool influenced the process of the organizational technique used by a manager. If the direction of the use of the neutral tool (empty sheet of paper) and the online managerial tool is different, the actions were taken during the process of planning (setting tasks as well as describing goals) are totally different. As it was described in Tables 3, 4 and 5, the differences are to be found in nearly all the parameters. For this reason, it is possible to claim that hypothesis H1 is false. There may be circumstances in which the versions of the planning would be similar, but the result of the verification of the hypothesis H1 should be relatively clear.

Simultaneously, in Section 6 discussing the qualitative results of the research, it was pointed out that the influence of the features on the content of solutions for an organizational problem was also significant. In the first stage of the experiment, the online and paper versions of the plan differed from one another very much. In the second stage of the experiment, the differences were much smaller. Furthermore, in the first phase of the experiment it was hard to find the same versions of the solutions' content created by any manager and in the second stage of the experiment, it was even more difficult to find different versions of the solutions' content created by any manager. This leads to the general conclusion that the features of the tool (or empty sheet of paper either the online managerial tool) have a strong influence on the content of solutions. It must, therefore, be assumed that the hypothesis H2 is false.

These conclusions let us question how much any managerial tool influences a managers' work – both the organizational technique and the content of solution for the organizational problem. We assume that further research on this topic is extremely needed, especially with the set of other managerial tools for solving other organizational problems, such as decision

making, motivating, creative thinking and others (Verboncu & Zeininger, 2015, p. 604).

It is worth adding that having patterns of solving organizational problems lets us improve the machine learning (Gacenga, Cater-Steel, Toleman & Tan, 2012, p. 95). Additionally, from the perception point of view the scientists construct the ontology of the scientific theories, which directs the active search of information. Such information, gathered by such experiments, gives the solution to the contradiction between theory and experiment should be considered in more details (Storozhuk, 2007, p. 378).

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