BUSINESS, MANAGEMENT AND EDUCATION
ISSN 2029-7491 print / ISSN 2029-6169 online
2013, 11(1): 109–136
doi:10.3846/bme.2013.07

STRUCTURAL ANALYSIS OF THE MANAGEMENT SCIENCE METHODOLOGY

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Received 13 May 2013; accepted 4 June 2013

Abstract. The article presents a structure of management science methodology, reduced to determination and description of its basic components. It has been covered in three levels, differing in the degree of detail description of methods. These are accordingly: the 1st level, identified with philosophy of methodology, the 2nd level corresponding to a method as well as the 3rd level, the most detailed, convergent with a technique. A structural analysis was used for identification and providing characteristics of particular components of the management science methodology.

Keywords: management science, methodology, methods, techniques.

Reference to this paper should be made as follows: Lisinski, M. 2013. Structural analysis of the management science methodology, *Business, Management and Education* 11(1): 109–136. http://dx.doi.org/10.3846/bme.2013.07

JEL Classification: M0, M00, M1, M10, M19.

1. Introduction

Great interest in the management science methodology observed in the last period encourages taking a closer look at its achievements. The numerous publications covering these issues are dominated by the studies of causative nature, presenting the problem of methodology partially, illustrating only its selected aspects. There is no attempt of comprehensive depiction of the management science methodology as a key determinant of this scientific discipline.

The purpose of this article is to present a structure of the management science methodology by defining and describing its basic components. In order to achieve such a formulated goal, it seems indispensable to use a relevant research tool. It will be analysis[1]. Its application will ensure, in our opinion, not only demonstration of all significant

[1] We assumed the importance of analysis following T. Pszczołowski (1978: 15), according to whom it is a "method of actions consisting in receipt of the product by dismantling some whole entity to smaller elements".
The use of analysis as a key research process usually comes down to implementation of its two basic goals. The first one called a structural analysis consists in determination of the object's structure, by indicating its composing elements, specification of characteristic features of the whole as well as of particular parts as well as separation of relations and their nature that occur between the elements of the whole. The second one, identified with a causative analysis, aims at getting to know the mechanisms of functioning of the examined whole, by determination of changes that occur therein, determination of the factors influencing the whole as well as the force, direction and intensity of the impact of these factors on the changes of the whole. To describe the construction of the management science methodology we will use a structural analysis.

components of the management methodology, explanation of the essence of each of them, but also outlining mutual relations taking place between them.

2. Essence of the management science methodology

The basic and primary category for all the following research topics will be the definition of the notion of management science methodology. The way of explaining its essence is presentation of definitions, representative for various methodological approaches. Multiplicity and diversity of the definitions of this concept quoted in the literature related to methodology[2] allow indicating appropriate one, bearing in mind the research goal adopted in this paper.

Such will be a determination according to which methodology is a science about scientific research methods and methods of development of scientific theories.

Therefore, the methodology includes two groups of methods. The first one is formed by methods of running science activities and research procedures used in science. It undertakes examination of results of methods' application, also their efficiency and cognitive value. All the methods are of utility character, and this part of the methodology is called pragmatic methodology.

The second group includes methods allowing learning the elements and structure of systems of sciences (their products in the form of notions, statements, theories of sciences). These methods, dealing with theory-cognitive issues, enable ordering and naming phenomena as well as formulating general statements by learning about the evolution of methods. Therefore, they constitute the basis for learning about the development of science. They form the so-called apragmatic methodology.

The management science methodology is a science about methods identified on the ground of this scientific discipline. The determinants of its arising, apart from other significant attributes, are also the methods developed for the purposes of examining and solving problems associated with management of organizations. In the period of more than 100 years of its existence, the researchers have identified a numerous set of management methods, of different nature, a very different degree of description detail, different research objectives, separate assumptions, diverse effectiveness. The methods focused on application are definitely dominating. Recently, we can observe a growing interest in apragmatic methods, which is connected with the cognitive character of development of this science.

[2] According to T. Kotarbiński (1961: 516), methodology can be generally identified as a science about methods, that is the ways of competent operation. According to T. Pszczołowski (1978: 118), methodology is a science about methods. K. Sosenko (2008: 146) defines it as a domain of knowledge dealing with the methods of justifying statements and the methods of construction of scientific theories. On the other hand, E. Babbie (2005: 29) understands methodology as one of the scientific branches about cognition, i.e. epistemology, and names it the science of finding out. Moreover, J. Mingers (Mingers, Gill 1997: 1) defines it as "a structured set of guidelines for activities to undertake to improve the effectiveness of an intervention". Compare also the abalysis of this term conducted by Lehaney and Vinten (1994).

Such understanding of management science methodology belongs to the detailed methodology, which examines the special character and autonomy of the methods used as part of this scientific discipline. The research problems solved here aim at preparing methodical standards of distinguishing, describing and codifying ways of the procedure so as to ensure that they lead to full-fledged knowledge from the point of view of this science.

The achievements of the management science methodology form also part of the general methodology, which examines methods and their cognitive results occurring in all disciplines of sciences. Creating a kind of superstructure for the achievements of particular disciplines of sciences, it deals with the methods of justifying statements as well as the methods of creating systems of sciences.

The basic category of methodology of sciences, also management sciences, is the notion of method[3]. It is defined in different ways[4], although they all can be easily brought to one, simple, comprehensive, but very accurate definition. The author of this definition is T. Kotarbiński. According to him, method is a systematically applied manner, with addition that manner means a course of any action, namely composition and system of its stages[5].

The practice of science methodology proves that the mentioned ways of action may be described more or less thoroughly. Regardless of the above, each method has a methodical attribute. It means that it is characterized not only by the described course of actions, but also a specified way of performing this action (Pszczolowski 1978: 119). A method has, thus a dual nature[6]. It may be only a course of actions, described more or less thoroughly. Then, it will be a method. It is perceived like this almost always. It may also be a methodology, when it presents a directive determining how to act. Then, it specifies a methodologically correct set of directives, indicating a way of action, methods leading to a particular goal, and also techniques used for execution of a component task (Pszczołowski 1978: 119).

The management science methodology described in this way can be considered as a system. This is because it has system requirements (Kozminski 1983: 83), being a sufficient basis to consider it in the categories of the general theory of systems.

[3] In etymological terms, the "method" notion originates from Greek language and it means a road which one has to follow pursuing a research process. A method means proceedings which should be undertaken and then made in order to solve a problem (Sosenko 2008: 146).

[4] For instance, according to A. K. Koźmiński and A. M. Zawiślak (1982: 51), "a method is a conscious and ordered manner of complex actions, repeated owing to its effectiveness". Z. Mikołajczyk (1995: 39) brings the importance down to a method to systematic procedure, based on scientific research rules which is intended at solving management problems for existing and designed institutions. J. Antoszkiewicz (1990: 29) understands a method, which should meet specific methodical requirements, as correlation of a methodical principle, the used approach, languages, equipment as part of the procedures used for solving specific problems.

[5] A method is defined in such a way by T. Kotarbiński (1981: 524).

[6] This duality of a method is not commonly identified. As noted by T. Pszczołowski (1978: 119), "the Polish language, like other languages, except Russian, has no two different terms for the listed two meanings, of which the first refers to actions, whereas the second to a directive indicating how to act".

In such perspective, it is of fundamental importance to determine the notion of system. Without taking up a discussion on the essence of this category, we assume the commonly accepted determination, according to which system is a whole made up of elements related with relations and creating the whole that is qualitatively different from the sum of elements (Kozminski 1983: 237).

The management science methodology is such a system. You can specify environment for it, describe its particular components, but also distinguish its subsystems.

The methodology's environment will not only be achievements of management sciences, but also of other scientific disciplines, expressing in their theoretical, methodological as well as practical experiences. The components will constitute methods, and those being a manner of actions, but also those that present a directive, defining how to operate. They will be characterized by a different degree of detail of description as well as a different way of use.

The adoption of the system approach for analysis of the management science methodology accepts the possibility of using such notions like subsystem or super-system. It results in the fact that a specified set of methods as a system may be a subsystem in one compartment and a super-system in the other.

Using such a way of description of the methods comprising the management methodology, we can state that if we treat them as a system, the methods identified as part of the general methodology will create their super-system. But, at the same time, such a system can be divided into two subsystems – a subsystem of pragmatic methods and a subsystem of apragmatic methods.

The above-presented management science methodology, described in the system formula, constitutes the object of our research enquiries. Achievement of the research objective set forth at the beginning, if it is to be effective, should result from a choice and then correct use, as specified in the research instruments. In our case, it will be structural analysis.

The use of structural analysis will enable identification of the structure of the management science methodology, by determination of its components, carrying out their characteristics as well as indicating and specifying the relations that occur between them.

These research topics will be the subject of our further enquiries.

3. Structure of the management science methodology

Determination of the structure of the management science methodology is of key importance in the discussion presented in this paper. We will bring it down, as it has been noticed earlier, to the definition of basic components of methodology, the definition of their nature as well as specification of their interrelations.

The analysis of a number of studies related to the management science methodology authorizes to make a statement that the publications which consider the issues

of identification and classification of methods of management are definitely dominating (Jagoda 1999; Lichtarski 1999, 2001; Martyniak 1999, 2001; Mikołajczyk 2008; Zimniewicz 2008). The papers whose authors deal with a description of the system of methods and attempts at determination of the management methodology are relatively modest in presentation (Błaszczyk, Czekaj 2010; Jagoda 1999a; Jagoda, Lichtarski 2003; Lisiński, Szarucki 2011). On the whole, we can note multiplicity of interesting proposals of examination of this problem, but also lack of unanimity among the authors of these studies. All these achievements, due to their still modest scope, only confirm a large degree of complexity of a problem and substantial difficulty in its solving as it results from it.

Without attempting at analyzing various views here, thus the most interesting and at the same time inspiring is the proposal by H. Jagoda and J. Lichtarski (2003: 3), which we will assume as the basis for our further discussions.

H. Jagoda and J. Lichtarski, in order to put in order a numerous and diverse set of research instruments used in management sciences, suggest a hierarchized structure of related solutions they call management recipe or idea. We will identify it with the structure of methods, making up the management science methodology. In this whole, we will distinguish, following H. Jagoda and J. Lichtarski, three levels differing in the degree of detail description of the methods. We will name them accordingly:

− 1st level, identified with philosophy,
− 2nd level, corresponding to method,
− 3rd level, the most detailed, convergent with methodology.

Assuming the system formula of description as adopted earlier, we can note that particular levels of the structure of the management science methodology are formed by three subsystems. Owing to their place in the examined whole, they will all create a vertical structure of the management methodology.

Analyzing the above-described structure of the management science methodology we can add also that these levels remain in inclusion relations with respect to each other. It means that the 1st level includes the second and third levels, and the second level contains only the third level. As a consequence, the management science methodology includes both methods (including the second level) as well as techniques included in the third level.

Each of the distinguished levels of methodology includes two groups of methods – pragmatic and apragmatic methods. The practical methods focused on application, identified under all of the three levels form a set that may be called a set of pragmatic methods. Similarly, the methods with different specific nature without utility qualities and used only to explain the facts or phenomena identified within the management science methodology, and to formulate generalizing statements, defined in relation to the three levels, constitute a set of apragmatic methods[7].

[7] Similar conclusions are formulated by H. Jagoda (1999: 10) noticing that in this hierarchized structure of related solutions we can distinguish the so-called idea layer, also referred to as "philosophical" layer, which includes the 1st level, and the tool layer which consists of the second level and third level.

The sets of utility methods of all three levels remain in certain relations one to another and form a pragmatic management science methodology. Similarly, the sets of cognitive methods of the three levels constitute an apragmatic methodology. Both methodologies can be treated as systems. They will form a vertical structure of the management science methodology.

In the management science methodology, methods, which results from their essence, must be realized - either completely or only in fragments. They also have to be used, to a larger or smaller extent, in the process of solving problems associated with management, both in terms of its particular functions, not only related to subject matter, category or organic, but also processes, and not only implemented with regard to particular functions, but also to their set. They can be accordingly named or unnamed. Therefore, the management methods penetrate an organization both in horizontal as well as vertical perspective.

The management methods evolve in a continuous manner (Ćwiklicki 2011; Jagoda, Lichtarski 2003: 5–6). This phenomenon applies to all methods and is multidirectional. It applies not only to transformations in the methods themselves, or development of themselves, but also modifications of methods as a result of changes taking place between them or of their transformations resulting in emergence of new domain systems of methods oriented towards problems.

Now, we will look at the particular levels of that particular structure of the management science methodology. Our analysis will start from the third level, being the level with the largest degree of details. It will be created by:

− procedures,
− techniques,
− groups of techniques.

A more complete analysis of the third level of the management science methodology will be preceded by defining its three distinguished components.

A procedure will be understood as a detailed course of action, specified in a number of consecutive activities as well as a set of directives (principles, recommendations, indications) that more accurately specify how these actions are to be made. Thus, a procedure is a chronological statement of all conscious and purposeful behaviors of entities (namely their actions) as well as regulations, guidelines and practical rules, determining their use in order to execute the undertaken task to be performed (Pszczołowski 1978: 185). For this reason, it comprises not only an exact description of subsequent actions, but also possibly precisely expressed explanation of how these activities are to be practically made. A procedure understood in such a way contains, bearing in mind its content, both a method and methodology.

A technique will come down to the way of conduct, with the level of details relatively smaller as in the case of a procedure. Techniques focus only on the description of sequence of activities and resign from instructions as to how operate, that is which recommendations or guidelines to use pursuing subsequent activities. Therefore, they describe, in a relatively exact manner, a chronological system of particular activities taken for execution of a research task.

Groups of techniques are at the same level of generalizations like techniques. Every group of techniques is created as a result of application of specified criterion of grouping. Most often, it is the same partial research objective which is pursued by particular techniques (e.g. collecting information on the process of work being implemented at a work post, specification of the condition of harmonization of activities etc.). It determines about the fact that, as aggregates of several techniques that explain a broader spectrum of methods of action, rather than particular techniques, they can be found in a classifier of methods on a similar level of generalization.

The above level of management science methodology contains research instruments that can be grouped in two groups – the first, pragmatic and the second, apragmatic.

The procedures and techniques are the basic instruments of management sciences which are of strictly application character. They serve solving research problems concerning creation and functioning of an organization. They constitute a kind of base, particular basis for other, more developed and more complex tools identified at the subsequent levels of the methodology of this scientific discipline, both in the groups of pragmatic as well as apragmatic methods.

A more in-depth analysis of the content of these research tools authorizes to state that each of them corresponds to one of the two meanings of the method, resulting from their nature. The first meaning, clearly identified in the procedure, consists in describing both the method of actions – that is the method and manner of execution of this action – namely methodology. The second is identical with a technique; it corresponds only to the description of the method of action, and thus is consistent with the content of the method, but is presented in more detail as compared to it.

The groups of techniques have apragmatic character. As sets of techniques, reflecting a broader range of methods of action to be used, do not have direct, utility qualities as compared to techniques. With their cognitive character, however, they allow ordering similar, bearing in mind the approved criteria, research tools, which means their more exact analysis in the context of the problem being solved. Therefore, they contribute to selection of more rational techniques.

The second level corresponds to a method. This basic category of each methodology, in the course of development of a specified scientific field, develops along with it. It is so also in the case of management sciences, hence a currently identified great deal of different, in terms of type, methods, with various degrees of description detail.

Analyzing the achievements of the management methodology, we see interesting attempts at ordering this category, which is valid for analysis of the science[8]. The main difficulty in finding a solution of this research task that would be satisfactory results from the fact that what is perceived is both cognitive duality of the method as well as a

[8] One of the best known is a classification of methods according to the declining degree of generality which was presented by Z. Martyniak. It consists of subsequently: principles, strategies (approaches and general methodologies), general methods, groups (families) of detailed methods, detailed methodologies, detailed methods, groups of techniques as well as particular techniques (Martyniak 1987: 127–129).

different degree of detail of their description. This leads to differentiation of its different forms. The second level in the methodology structure suggested by us will comprise:

− detailed methods,
− groups of detailed methods,
− detailed methodologies,
− general methods,
− general methodologies,
− principles.

The definitions of these notions will be a starting point for further analysis of this level of the management science methodology.

Detailed methods are particular ways of conduct, characterized by the degree of detail description, which is more general as compared to techniques. As a result, the detailed methods get closer to the canon of generality, designated and adopted for methods. The detailed methods refer to limited problems concerning the subject scope and thus do not have a universal nature. They apply to e.g. individual functions of the organization's operations or management functions.

Groups of detailed methods are such ways of conduct, which serve solving partial research tasks identified in subsequent stages of the research. The particular groups of detailed methods are created as a result of the application of a specified criterion of grouping. It is usually a function of the research process (e.g. determination of the time of activities in progress, formulation of possibly many proposals of the solution to a problem, adjustment of the research object to psycho-physiological requirements of a person etc.). As sets of several detailed methods in a classifier of methods they occupy the same level of generalizations as the detailed methods.

Detailed methodologies determine the manner of approach which is characteristic for each of groups of detailed methods. Being a methodological generalization of autonomy of particular groups of detailed methods, they do not so much indicate the way of operation but, first of all, a set of methodologically correct rules and directives defining its implementation. These methodological guidelines expose the threads associated with the answer to the following question: how to act? They equal to determining recommendations and indications, corresponding to the subsequently performed phases and stages of the proceedings, related to solving particular partial research tasks, selection of the most effective methods and techniques as well as respecting the assumptions of their efficient use.

General methods are characterized by a greater degree of generality as compared to detailed methods. By solving partial research tasks, they direct the way of operation at particular phases or stages of the research. They are often used in complex research processes. They often imply application of specified detailed methods. They include wider, as in the case of detailed methods, subject area, and thereby have definitely more universal scope of use. As components of general methodology, the general methods are also used successfully by other scientific disciplines.

General methodologies define the method of execution of actions typical of particu-

lar general methods. They reflect a methodological essence of particular general methods, being a generalization of their specific nature and character. They are characterized by more general, than in the case of detailed methodologies, method of description of execution of actions. This is because a set of recommendations concerning solving particular partial research tasks, selection of methods and techniques and their efficient use is less precise. A set of those guidelines is consistent with the concerned area of use of particular general methods. The methodological structure of general methodologies is determined with the achievements of detailed methodologies, the character of general methods as well as the achievements of general management science methodology.

Principles contain general rules of the proceedings, or guidelines of activities. They consist of generally defined, methodological frames setting the course of research procedure. They can constitute a starting point for the undertaken actions, or even recommend, what should and what should not be done. The principles, therefore, have a dual character. On the one hand, they are the most generally specified method, which gets close to the barely outlined rule, standard of proceedings, and on the other hand, they are far, because only a frame representation of the guidelines of activities.

The presented above definitions of different kinds of methods, identified as part of the 2nd level of the management science methodology constitute an interesting basis for formulating several generalizing conclusions.

The analyzed second classification of methods is a more complex specification than the previous level. It includes a number of research instruments of management sciences that differ with the degree of detail description, different nature as well as different suitability to the management problems being solved. These methods are ordered according to the growing degree of generality and their sequence have been presented before according to this criterion. Despite these differences, they all are consistent with one class of methods, basic for the classification of research tools of management sciences adopted here.

The analysis of the content of methods authorizes to make an observation that this set will constitute methods that can be identified only with the way of operation. Such will include detailed methods as well as general methods. The instruments contained in the set of methods, whose nature is convergent with the rules directing a manner of conducting actions will be detailed as well as general methodologies. A principle, like a procedure before, combines a dual nature of methods. It is both a generally specified course of actions, and a frame description of directives defining execution of this method. What makes it different from the procedure is definitely larger degree of generality. This is because a principle in general expresses the most specified standard of proceedings and guidelines for activities.

At this level of classification of the management science methodology we can identify, like previously, two groups – pragmatic and apragmatic methods. The group of pragmatic methods form detailed methods, detailed methodologies, general methods, general methodologies as well as principles. They all have a utilitarian character and

serve directly to solving management problems. Detailed methods consist of a group of apragmatic methods, which has cognitive character. It allows ordering, through classification, these groups of detailed methods and, subsequently, also naming phenomena concerning development of the management science methodology.

The most general level throughout the entire system of methods is the 1st level. The components of the management science methodology identified there constitute its philosophy. It will include:

− development lines of methods,
− methodological trends,
− methodological approaches.

This level is special and different from the previously discussed, bearing in mind its construction, but also phenomena, which it identifies. It includes relatively new and previously unknown research instruments. They are not only relatively internally homogeneous research tools with expressive structure and specified purposes, as in the case of the methods presented in the previous levels of methodology. In most cases they correspond to other, new methodological solutions, including special situational circumstances as well as environment phenomena, created using the methods described in previous levels, and combined into new qualities.

The structure of philosophy of the management science methodology includes, thus three basic components, but each of them is a unit containing a number of different methodological solutions.

The subject of our further considerations will successively be development lines of methods, methodological trends as well as methodological approaches indicated at the 1st level.

The literature of the subject with regard to management sciences which deal with the methodological threads enable identification of the first basic component of philosophy of the management science methodology. They are development lines of methods[9].

A development line of methods is understood as a specified regularity of the process of development of methods, expressing changes between methods, whose dominant source may be exogenic or endogenous factors.

The exogenic factors are formed directly in the method – its external environment relationships, without participation of other methods. They determine development of methods as a result of their practical use. In the course of application of methods, their particularization takes place. Sometimes also changes appear, which will be an answer to situational conditions of the research problem being solved with their assistance.

The endogenous factors reflect first of all relations with others methods. They consist in mutual penetrating, imitating or even duplicating the practically verified principles,

[9] The determination of development lines of methods was introduced to management science methodology for the first time by W. Błaszczyk and J. Czekaj. They referred this category to the phenomena of divergence of methods, which they identified exactly with diversification of development lines of methods (Błaszczyk, Czekaj 2010: 475).

components or research indications from some methods to others. The reason for it is raising efficiency of methods in effective organizational development. Both sources of changes result from the need to pursue development of methods following development of the environment.

The analysis of the literature on the subject, modest in this respect, indicates unitary attempts to analyze the mechanisms of shaping methods of organization and management. A worth reporting publication in this scope is the earlier mentioned work of W. Błaszczyk and J. Czekaj (2010), devoted to the condition and perspectives of development of methods of organization and management.

Assuming the above assumptions, we offer our own proposal of structurization of the management science methodology, but based on the decisions of the previously quoted Authors. Its basis will be the previously adopted definition of development line of methods.

The analysis of all methods of management assigned to the 2nd and 3rd levels of management methodology as well as assessment of their development from the moment of arising of this scientific discipline until now, enables indicating basic categories of development lines of methods. They will include: isolation, adaptation, diffusion (in narrow meaning), diffusion (in broad meaning) as well as diversification.

1. Isolation – is a line of independent development of methods. Development of a method takes place as a result of its insulation as compared to other research instruments, namely without the possibility of contact or crossing with other methods. Isolation corresponds to development of a method within one organization. It is the effect of adjustment to typical conditions of a given country. Establishment of this development line of methods is a result of objective factors, with respect to an organization, (e.g. geographical barriers) or subjective factors (e.g. situational factors). Thus, isolation is a process resulting first of all from the lack of effective instruments forcing use of methods and clearly developed and identified factors of the evolution of methods.

2. Adaptation – is a process of adjustment of a method to the changing needs of the environment in which it is used. It usually comes down to extension of its functional scope. Adaptation is an effect of growing environment dynamics, whose development forces adjustment to new methods, variable conditions of its practical use by various organizations.

3. Diffusion (narrow understanding) – is a development line consisting in popularization of new methods. The process of diffusion consist in using methods in an increasingly larger scale as compared to an organization, characterized by different potentials, also functioning in different conditions as compared to those already known.

Such understanding of the process of diffusion distinguishes two basic phases – a phase of small diffusion (it covers the period from the method's birth and initiation for experiments undertaken in large organizations) as well as the so-called phase of great diffusion in the course of which a new method penetrates small and medium-sized

organizations.

A large impact on the process of diffusion of a narrowly understood method, have situational factors of an organization (e.g. attitudes of the management staff and employees responsible for development of organization and management systems) as well as the economic situation of the country in which the organization operates. Also important are experiences in the scope of applications, but also the identified information about dissemination of methods, taken from publications or organized conferences.

Diffusion (broad understanding) – is a process of "(...) mixing various methods or accepting characteristics of one by the other, taking place as a result of their contact" (Błaszczyk, Czekaj 2010: 478). Such broad understanding of diffusion is evoked in the period of great diffusion, the second, basic phase of a narrow diffusion. Then, in the course of experiments related to its use in growing tendency to make communities in organizations, there are introduced modifications in particular methods. For this development line of methods, an important attribute is mutual contact between methods in the course of their practical use.

4. Diffusion, understood as above, has three forms. They consist of: **co-evolution, convergence** (leads to parallelism of methods) as well as **divergence.**

- **Co-evolution,** – is "(…) interdependent development of two or more methods and emergence of changes in one method as a result of occurrence of metamorphosis in the second method that adjust to each other at the same time" (Błaszczyk, Czekaj 2010: 474).
- **Convergence** – is a process of "… various methods becoming similar to one another; this phenomenon can be presented by identification and comparison of their specified features" (Błaszczyk, Czekaj 2010: 478). This process may often lead to **parallelism,** and thus leads to identity or content-, composition- or syntactic-related similarity between methods.
- **Divergence** – is "(...) diversification of development lines of methods" (Błaszczyk, Czekaj 2010: 475). It pictures modifications in methods, their evolutionary transformations leading to increase in differences between the nearly relative methods. This process is a result of not so much development of a method within one organization, but its adjustment to typical conditions of a given country. A result of this process is specialization in methods.

5. Diversification of development lines of methods is a process connected with occurrence of a new method, a so far unknown component of the management science methodology, which are cross-sectional management concepts (Jagoda 1999). They correspond to domain systems of general methods oriented towards problems. These methods are developed on the ground of new ideas and the corresponding management orientations (Błaszczyk, Czekaj 2010: 475). They are used to solve problems concerning the areas of organization's functioning, previously unknown from the point of view of their previous use. The development line of methods connects in one process opposing forms, identified in the broadly understood diffusion, such as: convergence or diver-

gence. We can, thus, speak about such cross-sectional concepts of management, which from the point of view of the method of description of execution of operation, start to resemble other methods, and, at the same time form some new, separate quality as compared to other, well-known methods, by differentiation of its methodological character.

The second main component of philosophy of the management science methodology, including a higher level of generalizations, are methodological trends.

A methodological trend can be understood as an internally consistent methodological attitude, based on theoretical assumptions, expressing specific research preferences, highlighting special insight into a problem area important for it. It creates a particular research perspective, identifying important methodological values therein, important for efficient solving management problems. This methodological context, perspective or attitude are methodological paradigms of management sciences[10].

The methodological paradigms, with the included, identified components of philosophy, constitute specific instruments comprising not only the defined principles, methods or techniques, but equally often the so-called good examples as particular, worth popularizing, patterns of building an organization or its functioning.

The methodological trends constitute an immanent ingredient of the management science methodology. They are created and developed under a certain school, concept, theory or intake[11]. They evolve along with it, creating its methodological canon.

Table 1 presents characteristics of basic methodological trends of management sciences. It contains a synthetic description of 16 following methodological trends: engineering, universal (administrative), interpersonal relations, operating research, social systems, empirical, system, organizational game, situational approach, cybernetic, psychological theory of an organization, sociological theory of an organization, praxeological, modernist, postmodernist as well as process.

[10] Paradigms in science as some commonly regarded achievements, which, at one point of development of sciences, deliver, to those who make the effort, explanation of their changes, model problems and solutions, have been specified by T. S. Kuhn (1969). T. S. Kuhn uses paradigms in two meanings. In the first one, he calls sociological, he identifies them with all beliefs, values, techniques etc., common to the members of a given community The second, exhibiting philosophical point of view, means one type of elements, within this whole, namely a specific solution of mind puzzles which when used as models or examples, may replace clear rules, producing the basis for solutions of the remaining mind puzzles of normal science.
Paradigms are thus important for scientific research, areas of analyses, which at some stage of the evolution of sciences, deliver, as T. Kuhn calls it, to the community of scientists, acceptable patterns - models, and thus values, laws, theories, techniques, applications or even equipment, the use of which exposes particular and tight tradition of scientific research and which lead to specific scientific achievement. Thus they have both a substantive as well as methodological dimension, becoming the basic premise, which directs the research effort of the community of scientists. Therefore, they are a primary criterion identifying the areas of sciences, both in the area of theory and methodology.

[11] The subject literature calls the basic directions identified in the course of development of management sciences in such a manner, see e.g. Z. Martyniak (2002), W. Kieżun (1980), F. Stoner, Ch. Wankel (1992: 45), A. K. Koźmiński (Ed.) (1983).

Table 1. Characteristics of basic trends in the management science methodology

Methodological trends	Genesis, basic ontological assumptions	Basic theoretical theses	Basic research methods and techniques	Main representatives	Main publications of major representatives
1. Engineering	Industrial revolution (numerous inventions and their application bring problems in the sphere of manufacturing). Need for increasing efficiency of processes of work executed in the sphere of production.	Improvement of processes of work in the sphere of workmanship subordinated to growth in production efficiency.	Elementary analysis, experiment, observation.	F. W. Taylor, K. Adamiecki, H. Le Chatelier, H. Gantt, H. Ford, L. M and F. B. Gilbreth	F. W. Taylor. *The Principles of Scientific Management*, Harper and Row, New York, 1911. K. Adamiecki. Harmonizacja jako jedna z głównych podstaw organizacji naukowej, *Przegląd Techniczny*, no. 49, 1924. F. B. Gilbreth. L. M. Gilbreth. *Motion Study*, Van Nostrand Company, New York, 1911.
2. Universal (administrative)	Industrial revolution (numerous inventions and their application bring problems in the field of management). The need for improvement in operation of the organization in the sphere of administration.	Examining the management function as well as observance of principles of management improves the efficiency of operation of an organization's management sphere.	Elementary analysis, experiment, observation.	H. Fayol, H. Emmerson, M. Weber, E. Hauswald	H. Fayol. *Administration industrielle et generale*, Dunod, Paris, 1916. M. Weber, *Wirtschaft und Gesellschaft*, Tübingen, 1914.
3. Interpersonal relations	Mechanistic look at employees, Great Economic Crisis. Consideration of the importance of employees and interpersonal relations in the process of improving work.	Taking into account factors of psychological nature raises work efficiency.	Observation, interview, experiment.	E. Mayo, F. J. Roethlisberger, T. Bata, R. Likert, M. P. Follett, A. Maslow, D. M. McGregor	E. Mayo. *The Human Problems of an Industrial Civilisation*, Macmillan, New York, 1933. R. Likert. *A Technique for the Measurement of Attitudes*, McGraw-Hill, New York, 1932. D. M. McGregor. *The human side of enterprise*, McGraw-Hill, New York, 1960.

Continued Table 1

4. Operational research	World War 2 and preparation of quantitative methods in solving military problems. The need for optimization of decisions in the sphere of manufacturing.	Optimization of economic decision-making as well as management processes improves the efficiency of the organization's operation.	Mathematical modelling, Statistical and econometric methods.	L. Kantorowicz, P. M. Blacket, F. L. Hitchcock, G. B. Dantzig, R. Gomory, H. In. Kuhn, A. In. Tucker, R. E. Bellman	L. Kantorowicz. *Matematyczne metody organizacji i planowania produkcji*, Leningrad, 1939. G. B. Dantzig. Programming in a Linear structure, *Econometrica*, Vol. 17, 1947.
5. Social systems	Ignoring employee bonds in the organization as a social system. Bringing an organization as a system down only to employee relations.	Maintenance of a balance between the elements of an organization as a social system and exposing social and mental factors which leads to improvement of efficiency of an organization.	Observation, modelling of the decision-making process, methods of theory of games, methods of theories of graphs.	C. I. Barnard, H. A. Simon, J. G. March, P. Selznick, A. W. Gouldner, A. Etzioni	C. I. Barnard. *The Functions of the Executive*, Harvard University Press, Cambridge, 1938. H. A. Simon. *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations*, Free Press, New York, 1945. J. G. March. The Business Firm as a Political Coalition, *Journal of Politics*, vol. 24, no. 2, 1962.
6. Empirical	Growing axiomatization and quantification of theories generates disharmony between a theory and practice of management. Need for further improvement of the organization's functioning. Need for elimination of these discrepancies through a pragmatic approach.	Use of the principles of a normative and empirical approach provides improvement in performance of the organization's functioning, especially maximization of the profit.	Observation, case study, comparative method.	P. Drucker, E. Dale, R. C. Davis, A. Sloan Jr., W. H. Newman, A. D. Chandler Jr., E. K. Warren, C. E. Summer	P. F. Drucker. *The Practice of management*, Harper & Row, New York, 1954. W. H. Newman, E. K. Warren, C. E. Summer. *The process of management*. Prentice-Hall, Englewood Cliffs, 1972. A. D. Chandler Jr. *Strategy and Structure: Chapters in the History of the American Industrial Enterprise*. MIT Press, Cambridge, 1962.

Continued Table 1

7. System	Identification of faultiness in management of great investment projects or programs, impact of a general theory of systems on the organization. Use of a system approach for solving problems of an organization.	Examination of an organization as an open system, system thinking and use of achievements of other sciences, eliminates faultiness in management of organizations.	System analysis, system modelling	K. Boulding, L. von Bertalanffy, J. M. Forrester, G. Nadler, R. A. Johnson, F. E. Kast, J. E. Rosenzweig	K. Boulding. General systems theory: the skeleton of science, *Management Science*, April, 1956. R. A. Johnson, F. E. Kast, J. E. Rosenzweig. *Theory and Management of Systems*, McGraw-Hill, New York, 1963.
8. Organizational game	Management issues with increasingly complex organizational systems. Use of the concept of an organizational game for solving problems of an organization.	Use of an organizational games and exposing the integration mechanism, fighting any varieties of determinism, reductionism as well as apriorism in examination of organizational phenomena provides efficiency of an organization.	Modelling, deduction, system analysis	M. Crozier, E. Friedberg, A. Rapoport, E. Goffman, I. Mangham, G. C. Homans, J. W. Thibaut, H. H. Kelley, G. Simmel	M. Crozier, E. Friedberg. *L'acteur et le systeme. Les cintraintes de l'action collectiva*. Paris, 1977. A. Rapoport. *Game Theory as a Theory of Conflict Resolution*. D. Reidel. Publishing Company, Boston, 1974.
9. Situational approach	The increasingly smaller effectiveness of universal and normative principles and patterns in solving problems of an organization and management. Use of the concept of contingence for solving problems of an organization.	Approving free selection of variables having the greatest impact on the examined phenomenon, adoption of the principles of measurability of processes and improvement in measurement of situational variables leads to rationalization in solving problems of an organization.	Situational models, induction methods, method of classification, comparative analysis.	H. Sherman, W. Gomberg, J. W. Lorsch, P. R. Lawrence, J. Woodward, F. E. Kast, J. E. Rosenzweig, F. Luthans, T. I. Stewart, T. Burns, G. M. Stalker	H. Sherman. *It all depends. A pragmatic approach to organization*, University of Alabama Press, Tuscaloosa, 1966. F. Luthans, T. I. Stewart. A General Contingency Theory of Management, *Academy of Management Review*, April, 1977.

Continued Table 1

10. Cybernetic	The possibility of using achievements of cybernetics (the theory of information, automation, IT tools) as effective methods of improvement in the organization's functioning. Use of cybernetics in solving problems of an organization.	Approving the organization as a cybernetic system, simplification of complex reality and limitation of category to notions, which can be expressed numerically is to lead to improvement in the efficiency of the organization's functioning.	Cybernetic modelling, deduction, statistical methods.	N. Wiener, W. R. Ashby, S. Beer, O. Lange	N. Wiener, *Cybernetics or Control and Communication in the Animal and the Machine*, Wiley and Sons, New York, 1948. W. R. Ashby. *An Introduction to Cybernetics*, Chapman & Hall, London, 1956. S. Beer. *Cybernetics and Management*, English Universities Press, London, 1959.
11. Psychological theory of an organization	The possibility of using the theory and practice of psychology in business operations. Utilizing psychological methods in solving problems of an organization.	Adoption of behavioral, psychodynamic and cognitive intakes as the basis for explanation of the phenomena taking place in an organization or in its surroundings provides rationalization of business processes in the organization.	Observation, experiment, methods of interview, psychological methods, deduction, psychotherapeutic methods.	D. Katz, R. L. Kahn, E. Berne, R. R. Blacke, J. S. Mouton, D. C. McClelland, D. H. Barnham, F. Herzberg, V. H. Vroom, R. M. Cyert, J. G. March, H. A. Simon, F. E. Fiedler	D. McGregor. *The human side of enterprise*, New York, 1964. R. M. Cyert, J. G. March. *A Behavioral Theory of the Firm*, Prentice Hall, Englewood Cliffs, 1963.
12. Sociological theory of an organization	The possibility of using a system of social macrostructure as the organization's sociological variable. Use of sociological variables in solving problems of an organization.	Examination of the organization as a system of social macrostructure determines improvement in the efficiency of an organization's functioning.	Modelling, methods of formulation of hypotheses, sociological methods.	C. H. Saint-Simon, A. Comte, H. Spencer, T. Veblen, E. Durkheim, M. Weber, E. Mayo, K. Mannheim, R. M. Cyert, J. G. March	E. Mayo. *The Social Problems of an Industrial Civilization*, Routledge & Kegan Paul, Boston, 1945.
13. Praxeological	The possibility of using the achievements of praxeology, in particular with regard to determination of the conditions for the most efficient functioning of teams. Use of praxeological approach in solving problems of an organization.	Semantic analysis, concept of efficiency of actions are the methods of improvement in actions of employee teams.	Observation, questionnaire and interview methods, a method of verification of hypotheses, deduction.	T. Kotarbiński, J. Zieleniewski, T. Pszczołowski	T. Kotarbiński. O pojęciu metody, in *Elementy teorii poznania, logiki formalnej i metodologii nauk*, Ossolineum, Wrocław, 1961; J. Zieleniewski. Prakseologia a teoria organizacji, *Prakseologia*, no. 2/50, 1974.

End of Table 1

14. Modernist	The possibility of using modernism for rationalization of the organization's functioning. The need to include models, good practices, "soft" elements of an organization. Use of achievements of a modernist concept in solving problems of an organization.	Adoption of a narrowly understood rationality, autonomy, objective science, the idea of unity, whole, idea of system approach as rules, provides improvement in efficiency of the organization's functioning.	Observation, induction, analysis, statistical and econometric methods, methods of standardization.	R. T. Pascale, A. G. Athos, T. J. Peters, F. H. Waterman, W. Ouchi	R. T. Pascale, A. G. Athos. *The art of Japanese management*, Simon and Schuster, New York, 1982; T. J. Peters, F. H. Waterman, In Search of Excellence. *Lessons from America's Best-run Companies,* Harper & Row, Chichester, 1982.
15. Postmodernist	The possibility of using postmodernism in rationalization of the organization's functioning. The need for redefining some categories of management (e.g. culture, authority, uncertainty, approach to changes). Use of achievements of the postmodernistic concept in solving problems of an organization.	Institutionalization of pluralism, heterogenous character, regionalism and ambivalence, expressed in a particular approach to organizational changes lead to organizational improvement.	Social research methods, metaphors, case study, deduction.	G. Morgan, L. Smircich, B. Czarniawska-Joerges, J. Hassard, D. Pym, B. Sievers, Z. Bauman	G. Morgan. *Images of organization*, Sage, Newbury Park, 1986. B. Czarniawska-Joerges, *Narrating the organization: dramas of institutional identity*, University of Chicago Press, Chicago, 1997.
16. Process	Need for fast response to changes in the environment of an organization, classic functional structural solutions focused on functions and tasks are hardly effective. Use of the concept of an organization oriented towards processes in solving problems of an organization.	Analysis of business processes, the internal dynamics of an organization, improvement of organizational courses, change management, learning, improves functioning of an organization.	Case study, process analysis, deduction	M. Hammer, J. Champy, R. L. Manganelli, M. M. Klein, S. Stanton, H. J. Johansson, N. Venkatraman, T. H. Davenport, J. M. Short, V. D. Hunt	M. Hammer, J. Champy. *Reengineering the corporation: A manifesto for business revolution*, Harper Business, New York, 1993. R. L. Manganelli, M. M. Klein. *The Reengineering Handbook: A Step-by-Step Guide to Business Transformation*, American Management Association, New York, 1994.

Source: own elaboration based on (Koźmiński (Ed.). 1983; Martyniak 1986; Witzel (Ed.). 2001; Czerska, Szpitter (Eds.). 2010; Zimniewicz 1990; Haich 2002; Robbins, DeCenzo 2002; Błaszczyk (Ed.). 2005).

Each of the methodological trends describes its typical methodological paradigms that are characterized here in a broad context. This is because they are explained both by determination of the origin, basic ontological assumptions, basic theoretical theses, but also indication of key research methods and techniques, the most outstanding representatives, or most important publications. They depict a structure level of a philosophy of the management science methodology, explained in a convincing manner, and as it seems, more general as compared to development lines of methods.

The third primary component of a philosophy of the management science methodology will be methodological approaches corresponding to the most general level of the structure.

A methodological approach expresses a dominant, in a given period, methodological orientation. A special attribute differentiating the methodological approach are its attitude towards the organization, as an object of improvement and an attitude towards environment in which the organization operates. In the approach we can identify specific methodological trends, usually new, previously unknown as well as methodological concepts, being a particular composition of the already known methods based on the whole methodological achievements of management sciences, but also the whole diverse class of methods. Typical of a methodological approach are development lines of methods, those new, expressing different than previously quality in the process of development of methods, or the already existing, which will be an answer to the demands related to solving specific problems of an organization.

Using all the previously presented information illustrating the structure of the 1st level of the management science methodology, referring, like previously, to a description of the methods identified at the 2nd and 3rd levels as well as taking account of their development, we will distinguish the following methodological approaches: classic, organizational, mechanistic, organic as well as contemporary.

Currently, we present the characteristics of particular approaches in development of the management science methodology in a synthetic manner.

Classic approach includes methodological achievements related to creation and the period of formation of the management science methodology. The period of its dominance falls on the first half of the 20th century. This approach consists of the methodological achievements of the following trends: engineering, universalistic (known as also administrative), interpersonal relations, operating research as well as social systems.

The analysis of this approach indicates not only creation of original research concepts, but also the first successful tests of a description of methods. Characteristics of 25 methods of improvement of an organization, prepared by E. Hauswald (1935: 257–262), is an outline of a modern methodology of organizational research.

This approach is focused on an organization, especially its components, especially work processes. It prefers it exactly as a basic research area and crucial in deciding

about improvement in efficiency of the whole. It treats an organization fragmentarily and as an instrument. It is nothing else but its components, examined in isolation from others, that are the addressees of the improvements considered at using the methods created here. These improvements are ways of improvement in functioning of an organization.

The typical development lines of methods were isolation and, in the final stage of the classic approach, also adaptation as well as diffusion brought to dissemination of methods.

Another approach is **an organizational approach.** It changes the orientation, dominant in the period of a classic approach, typical of the initial period of development of the management science methodology. This is because it is focused on using new methodological decisions in improvement of functioning of an organization as a whole.

It is nothing else but an organization that is becoming the main object of research. The projects resulting from methodological achievements of management sciences focus on it, which is already a whole. This results in multi-aspect approach to improvement in, no longer parts of a whole, as previously, but the whole.

Looking at the organizational approach we not only find methodological trends known from a classic approach, but we can also indicate new ones. These will include the empirical, system, organizational game as well as situational trends. They appear not only as a response to the increasing methodological needs of an organization, but also are a result of creative criticism of methodological achievements of trends of the classic approach.

A significant level of activity can be noticed in the sphere of methodology. Apart from the process of creating new research instruments, there are attempts undertaken to register and classify methods[12]. Also taking place are successful proposals of generalizations of methods in the form of methodologies of proceedings[13]. The registrations, classifications as well as methodologies of proceedings, prepared over this period, relate, above all, to one management function – organizing.

[12] For instance, recording of 45 methods, conducted by CERMA (Martyniak 1976: 76), classification of CERMA methods conducted by M. Budzanowska (1967), classification of chosen methods recorded by CERMA conducted by A. Drevet (1971), or a synthesis of the methods previously prepared by E. Hauswald, CERMA, A. Drevet and A. Moles, conducted by Z. Martyniak (1976: 118).

[13] For instance, a general method of organizing by J. Trzcieniecki, (1964), methodology of solving organizational problems by Z. Mikołajczyk (1973), a classic (diagnostic) method by Z. Martyniak, (1976: 43) as well as J. Trzcieniecki (1979: 34), or forecast methods by J. Trzcieniecki, the first one of 1970 (Czermiński, Trzcieniecki 1972: 136) and its following issue of 1979 (Trzcieniecki 1979: 26).

This approach is characteristic of one basic theoretical area of management sciences as well as main, consistent with it, scope of methodology of this scientific discipline. It consists of all the previously listed research orientations separated from the moment of establishment of management sciences. An organizational approach closes, in our opinion, the period of formation of the subject-matter and methodological canon of management sciences.

The organizational approach enriches methodological achievements of a classic approach, not only with the achievements of the subsequently produced trends. A special methodological system of management sciences is created, which covers and surrounds a functioning organization. It determines the methodological rules of its improvement.

The dominating development lines are adaptation as well as diffusion, brought down to dissemination of methods.

Mechanistic approach is the third in turn methodological approach identified in the evolution of the management science methodology. Its important assumptions are noticed as early as in the 1960s of the twentieth century, but it becomes a dominant methodological approach as late as in the 1980s.

Certain stagnation can be noted in the area of development of the management science methodology. The methodological trends borne at that time are an expression of this. These usually are considered the following trends: cybernetic, psychological theory of an organization, sociological theory of an organization as well as praxeological. Establishment of these trends under management sciences is a response to significant achievements of other scientific fields and readiness of considering it as an enriching subject-matter canon of management. Therefore, we are observing specific creative transfer and adaptation of achievements of other sciences, recognized as original and worth using, to the ground of management sciences.

Regardless of this, there are attempts undertaken of methodological reassumption of the previously known generalizations of methods in the form of methodologies of proceedings. They mainly apply to organizing function, like the previous ones[14].

The new methodological adjudication typical of this approach assume as assumptions the Newton's mechanistic logic as well as methodological ideas of management sciences and other disciplines and social and economic sciences, formed in the period of the dominance of the organizational approach. These rules acquire a new, full and original methodological form in the 1980s and their source is increasingly more turbulent, but further predictable, environment.

[14] For instance, organizational strategies according to Z. Martyniak (1987: 131): descriptive-improving, functional-modelling, diagnostic-functional.

In the management science methodology, the indications concerning monitoring of the phenomena in the environment of an organization and proposing changes in its functioning, as their effects, become increasingly more significant. Also emphasized is the need of integrating various functional areas of an organization.

Still dominating, however, are the principles whereby the examined phenomena are included in a static manner, not taking account of passage of time. The areas subjected to analysis, both the ones related to inside of an organization as well as its environment are diverse, narrowly defined and poorly integrated. The examined relations are targeted, characterized by linearity, determinism, sequentiality as well as causality.

Still the basic development lines of methods are adaptation and diffusion. In the final period of dominance of the mechanistic approach we notice the first attempts to diffuse methods, identified here as mixing various methods.

The next approach distinguished by us is **organic approach**. Its modest beginnings, reduced to a fragmentary use of its assumptions are noticed already at the end of 1970s, but this approach acquires full dimension as late as in the 1990s of the twentieth century.

The main effect on establishment and development of this approach have new ideas in social and economic sciences. It is them, which standing in opposition to the mechanistic approach, impose a different methodological standard of an organization's improvement. The previously unprecedented degree of turbulence of the environment, especially the further one, is not without importance. Its effect is growth in the importance of strategic aspects in the undertaken research topics.

The organic approach in its methodological area of achievements is not a monolith. Researchers identify in it both the mechanistic approach trends, but also new ones such as modernist, postmodernist and process trends. Their creation is related to a kind of reflection on paradigms of social and economic sciences. It leads in consequence, to enrichment of the previous achievements of management sciences with general-methodology considerations, considered as general methodology. The source of the performed changes are also particular aspects of recognition of an organization as an object of improvement.

The typical attributes of organic approach is consideration of time in continuous aspect, presentation of phenomena dynamically, that is including passage of time. Research is characterized by sequentiality, evolutionarism, voluntarism and development of new solutions. The areas of an organization, but also of it environment are analyzed in full integration, manifested itself in the very areas as well as in the relations between them. The identified relations are interactive; they are characterized by interdisciplinary knowledge, integration, relevance as well as information feedback.

Methodology, relying on previous achievements, formulates generalizations taking account of valid achievements of theories, methodologies as well as expectations of the environment.

The development lines of methods, whose effects can be found in the achievements of methodology of this period are the previously identified adaptation and diffusion – as popularization of methods as well as its wider recognition, reducing diffusion to the process of mixing various methods. In the period of the full heyday of organic approach, symptoms of a new development line appear. It is diversification understood here as formation of cross-sectional management concepts.

Contemporary approach is the last methodological approach identified by us. It is a methodological collage, a kind of mixture of methods (from cross-sectional management concepts, through principles, methods, to particular techniques), special context and various impact of methodological paradigms, key and dominant factors of external environment as well as internal environment of an organization as well as basic research areas and relations between them, occurring over the last two decades of development of the management methodology. The achievements of mechanistic approaches and, first of all, the organic approach as well as the trends identified as part of them constitute a kind of base, which allows creation of rules that are typical of the contemporary approach.

The new quality, called here the contemporary approach is created here, also with participation of the phenomenon of synergy. Its main attribute is compliant co-existence of various methodological attitudes. An expression of this are, on one hand, the methods comprising methodologies of management sciences, and, on the other hand, the defined attitudes of those, who use them practically, conditioned, however, by some guidelines of their selection and use. We can identify particular flexibility as well as considering situational aspects in selection and use of the previously known methodological instruments. It all consists of the contemporary image of management science methodology.

This approach also includes development lines of methods. They are, typical also of other periods of development of the management science methodology – adaptation, or diffusion, consisting in dissemination of methods and diffusion identified with mixing of methods and diversification.

The summary of all the above achievements concerning of the structure of management science methodology is a classifier of this scientific discipline. It seems that it illustrates a construction of the methodology of this science well. It is illustrated by figure 1 (see Fig. 1).

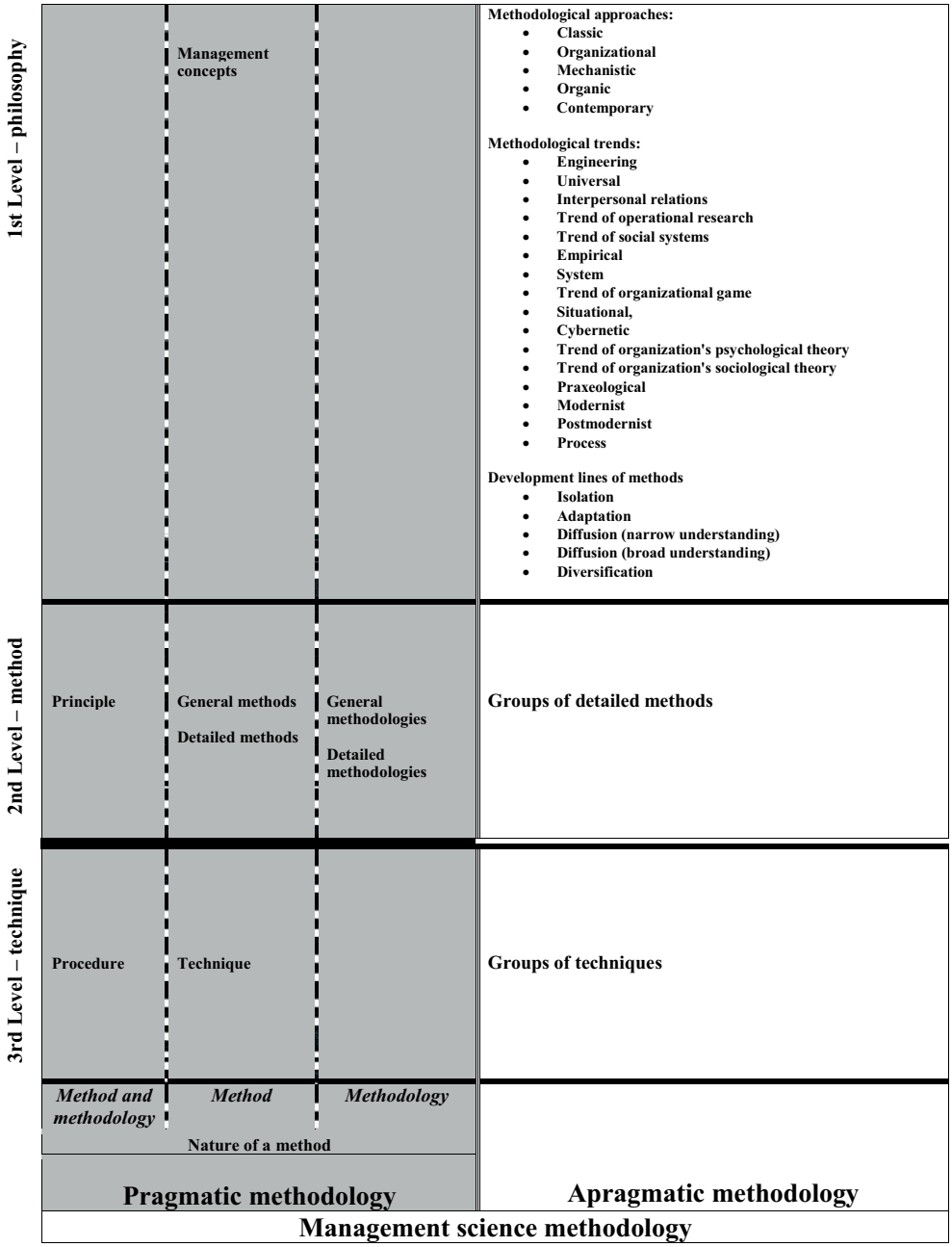

Fig. 1. A classifier of management science methodology
(source: prepared by the author)

4. Conclusions

The above-presented analysis of the management science methodology is a suggestion of comprehensive depiction of this significant management determinant as a scientific discipline. It describes both particular components of methodology as well as relations that occur between them. A number of threads undertaken here should be considered more as a basis to undertake further investigation rather than as a final solution. All achievements presented here should constitute creative inspiration for conducting further research topics concerning management methodologies. Moreover, exploring the advantages and disadvantages of the application of quantitative techniques in management would be another interesting topic for future research.

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