Introduction to the Management Science System (2nd edition revised; 30 May 2014)[1]

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Słowa kluczowe: System, system zarządzania, system nauk o zarządzaniu (NOZ), struktura NOZ, rezultaty NOZ.
Key words: system, Management System (MS), Management Science (MSc) System, MSc structure, MSc results.
Synopsis: The aim of the paper is to lay the foundations for exploring Management Science (MSc), focusing on selected issues, such as the differences between natural sciences and management science, MSc system attributes, MSc structure and results.

Introduction

Management science, or sciences (hereinafter: MSc), just like economics, or economic science (hereinafter: ESc), is surrounded by a great deal of controversy today.

The aim of this paper is to lay the foundations for exploring Management Science (MSc) as a system. Its framework provides only for outlining the problem, in a selective, limited and synthetic manner. The objective scope of the considerations herein covers the interrelated: 1) aspirational factors and core of scientific activity; 2) doctrine and constraints of scientific activity; 3) relationship between scientific activity and its internal as well as external independent variables.

The material scope is focused on action systems (AS). I divide systems into natural systems and action systems. I assume that natural systems emerge spontaneously,[2] whereas action systems are artefacts, created by man, which function and behave in a purposeful manner. Action systems may not exist without being linked to natural systems, and together they form civilisation systems (Ancient Roman civilisation, Mediterranean civilisation, post-modern civilisation, etc.).

The approach adopted herein is a systematic one, based on MSc and praxeology. From this vantage point, the scope of theorems herein is not limited, and the main inference methods are deduction and creation. I am operating at the highest possible level of reasoning and metalanguage. To conduct the line of reasoning at a lower level would limit the scope of theorems.

1. Preliminary (baseline, *a priori*) assumptions

Preliminary assumptions are theorems, adopted as true at the outset (via decision), which are not subject to consideration or discussion thereafter. Such *a priori* theorems have the status of axioms, if they are generally accepted in a given field of science, or foundations, if I alone use them to base my reasoning.

1.1. Material scope of considerations

The scope is focused on action systems (AS). I differentiate existing and transcendental systems. The former comprise tangible systems, i.e. those that have substance identifiable by all human senses, which can be based in a particular spacetime (TS), and virtual systems. Virtual systems are real (they exist), but they may not be weighed or tasted, etc., they can only be described in terms of certain sensory factors: visual and auditory. Their substance lends itself to a realistic description using only those two human senses.

Another important system typology is the above-mentioned differentiation into natural and action systems.

1.2. Science and its attributes

Science is a type of human activity, like brewing beer or writing books. Based on the criterion of the origin of attitude to science, human activity can be divided into pre-scientific, scientific, non-scientific and unscientific.[3] To understand this division, the definition of science attributes (scientificity) is of key importance, with significant historic connotations, in terms of spacetime adequacy. Our contemporary understanding of science is strongly determined by the tradition of natural sciences, although there are also liberal studies, social and formal sciences.

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[1] Cf.: H. Witczak, Wstęp do systemu nauk o zarządzaniu, *Współczesne Zarządzanie*, no 2/2013, pp. 27 – 40.

[2] I assume that existing systems develop in an evolutionary, rather than creationist manner.

[3] Science today is a separate domain of activity (a sector of society). Brewing beer is a non-scientific activity – a different sector. When in ancient times people started brewing by trial and error – it was a pre-scientific activity (they had no idea of the nature of the processes involved, etc.). Today, brewing involves a whole range of sciences (biology; biochemistry; chemistry; physics; etc.) and we can say that it has reached the scientific stage (brewing science, or brewing with a significant input of science). However, if we brew beer ignoring the available scientific advancements and we serve our guests "dishwater" – it is an unscientific activity, i.e. rejecting scientific standards, even though they are evidently in place.

The concept of science is founded on science requirements, applicable in a given TS, and relevant to a chosen thing (material scope), and the object of the researcher's interest, related to that thing (objective scope). In other words, scientificity is a quality of procedure applied to a given thing, specifically – the scientific procedure. Scientific procedure encompasses all possible scientific operations performed by the party involved (scholar) with regard to the given thing, and their scientific results.

Scientificity is a complex (aggregate) quality, comprised of individual characteristics. In my opinion, the contemporary ***requirements of scientific procedure*** (in the given space and time) include the following:

1) Scientific objectives and the corresponding scientific results. There are five groups of objectives and matching scientific results: (C)ognitive, (A)xiological, (R)esponsive, (N)ormative and (I)mplementative (CARNI).

Cognitive objectives and results (C) are aimed at getting to know (data, information, knowledge, wisdom). The cognitive process and the resultant cognition are subject to exploration, classification (taxonomy) and explanation. The cognitive process produces cognitive scientific theorems.

Axiological objectives and results (A) refer to values, i.e. assigning value to a given scientific object using the concepts of good/bad. Scientific value assignment requires that one define the criteria for valuation, assessment and measurement, including significance and status. The value assignment process results in axiological scientific statements.

Responsive objectives and results (R) are related to determining the approach to responding to cognition and valuation (e.g. whether to respond and on what principles). If we approach a given object of scientific process in a holistic manner (CARNI), response is preceded by diagnosis. As a result, we identify any potential scientific problems related to the object of scientific process. We can either end the scientific process there and then (cease responding), or continue it. The next step then is determining the reference model of the studied object, though it is not obvious what it should be based on and on what principles. In non-scientific activities, such sources (bases) other than diagnoses may include creating, benchmarking, analogies, will. In scientific activities, they will be the same as above, except for will, but the approach to the source and transformation into a reference model, must comply with the requirements of the scientific process. After the problem is diagnosed, the scientist may proceed to formulating the scientific model by way of creating (pure heuristic-based prognostic method), disregarding diagnosis (pure diagnostic modelling). Responding results in theorems about the principles of scientific activity following diagnosis, and preceding scientific decision-making.

If scientific responding proceeds to the next step of the scientific process, it is scientific decision-making, or normative activities (N), about the given object. Its objectives and results are theorems about master model(-s) of the given thing. Models answer the scientific question what the given thing (object) should be like, according to scientific modelling, in a given spacetime TS. Scientific decision-making may be historical (what the given thing should have been like), contemporary (what the given object should be like here and now), and prognostic (what the given object should be like in the future).

Finally, implementative objectives and results refer to transforming master models into real scientific facts (I). On the one hand, we may have theorems about proceeding from the master model to its original (real fact), on the other – scientific facts alone, having implemented a scientific model. Every act of actual civilisational progress has scientific, non-scientific, pre-scientific, and even unscientific sources. Many actual things came to be outside of the realm of science, which obviously puts into question its "implementative power", or "power of progress". There is no doubt that there are many problems here that have not been addressed sufficiently. For example, flights to Mars will not take place without a significant and crucial input from science. Yet, many software solutions are implemented thanks to the genius of non-scientific creators, etc.

2) Solving scientific problems. A scientific problem is a scientific challenge of CARNI nature – cognitive, axiological, responsive, normative and implementative. An ordinary challenge differs from a scientific one in that the latter is not included in the set of pre-scientific, non-scientific and unscientific problems, and is characterised by non-triviality and scientific progressiveness (significance). Counting items of stock in a warehouse is not a scientific challenge, nor is pondering "how many devils can sit on the head of a pin". On the other hand, discovering the Higgs boson, a hypothetical particle/field responsible for mass, may definitely be regarded as one. The basic scientific problems that we deal with are "discoveries" and "inventions". Yet, scientific activity also involves verifying and falsifying preceding scientific theorems and facts, etc.

3) Scientific results. These include primarily theorems (mainly CARN – basic science) and in one case scientific facts (mainly RNI - applied science) when science transforms reality by introducing scientific change. Improved scientific processes, scientific theorems as well as scientific discoveries and inventions are manifestations of scientific progress. Development of a new pharmaceutical, if it is to be a scientific discovery (I), must be preceded by scientific stages (CARN), otherwise it can lead to tragic therapeutic consequences (in a non-scientific activity – therapy). On its own, knowledge (C) which particular gene is responsible for a given neoplastic process does not mean that we can pursue cancer treatment (I, followed by therapy). The same principles also apply to the relations between other stages of the scientific process, and

even inside one stage. For instance, cognitive theorems can be regarded as scientific if they have a predictive value. A given science is complete if it performs all the above-mentioned functions (CARNI).

4) Compliance with the scientific methodology. Methodology, in the broadest sense, is the "scientific workshop". To be more precise, it includes: scientific language; logic of scientific reasoning; scientific methods; scientific tools and instruments; scientific procedures. A scientific methodology takes into account the above-mentioned factors, and most importantly, is unbiased, rational, true and subject to corroboration (verification and falsification). In other words, it is required that the applied methodology not be: biased, irrational or non-rational, false and not open to independent confirmation.

Moreover, science itself may be subject to the scientific process, and if it is conducted in compliance with the above-mentioned principles – we deal with a metascience in a given field (e.g. management metascience – science about management science).

Another factor which impacts onscience attributesin a given field of science is***the nature of a given thing subject to the scientific process***.

1) The focus of scientific interest may not be confined. There is no reason why transcendence should be excluded from the realm of scientific inquiry, although at present it is difficult to understand what the scientific approach might involve.

2) Singularity and distinctiveness of existing things– tangible (including natural and artefacts) and virtual. Without a doubt, these three categories of things differ. This requires that category-specific scientific approach be applied to each one. Scientific process also has its scope: material, objective and spacetime-oriented (TS). This scope can range from the strictly local (e.g. idiographic, or individual) to the strictly global – complete (universal, systemic – applicable to the entire existing world).

2. The current status of MSc

The status of management science system has not changed since H. Koontz formulated his Management Theory Jungle [Koontz, 1961]. What is more, the entropy of MSc, understood both as a scientific activity, and its results, has not decreased.

To investigate the current status of MSc, one has to define the starting point, i.e. scientific assumptions (doctrine), objectives, scope and methodology of the investigation.

MSc results are mostly theorems about a given object, in the form of laws, regularities (patterns), principles and rules. Today, we are also aware that scientific results include axiological theorems, too, as no human activity is devoid of values assigned to it.[4] The category of "scientific value" has its cognitive and axiological designates. Cognition of the "scientific value" category consists in exploration, classification (taxonomy) and explanation. In other words, cognition involves determining the nature, identity (singular and distinctive nature; status, location and significance) of scientific value, and its substantiation, including but not limited to in terms of origin and cause-effect. Value judgement involves defining scientific value in terms of good/bad criteria, assessing and measuring the levels of good/bad in each value, as well as the total value. In this context, without delving deeper into the subject, we can evaluate a given activity, including scientific results, as those of the highest, or exceptional value, and others – as those of low, or negligible value. The judgement hinges on such criteria as compliance with the scientific canon, scope and completeness of scientific result, strength and irrefutability of corroboration, conviction. For instance, scientific hypotheses have low scientific value by nature, seen as they are theorems prior to scientific proof.

I differentiate five categories of scientific value: substantive, methodological, utilitarian-empirical, educational and systemic. Below, I am defining the current scientific value (cognition) of MSc, and provide a synthetic value overview (value judgement).

2.1. Substantive content (substantive scientific value)

We are still dealing with the management theory jungle, and it is bigger and wilder than ever. Substantive content manifests itself mainly in the results of scientific procedure, due to their capacity to open, solve and close scientific problems. Substantive scientific value grows as scientific theorems and facts become more capable of exerting scientific impact – opening, solving, closing, transforming the nature of – scientific problems: cognitive (C), axiological (A), responsive (R), normative (N) and implementative (U). This capability, when it comes to scientific theorems, can be no more than a regularity. It is not certain whether MSc by itself determines any laws (regarded as the highest form of theorems). Applied science forms such as principles, recommendations and guidelines prevail and sometimes the status of MSc as a cognitive basic science is called into question. Its achievements are mainly in the normative realm (N) and implementation of standards (I), whereas the axiological field (A) is treated either as unscientific, or at most as admissible [Sułkowski, 2005]. MSc is treated as a science (sciences) whose scope is closer to the idiographic end of the

[4] Activity is a conscious and goal-oriented behaviour, whereas a goal – among other things, but this being one of the key defining factors – is the status desired by the involved party towards which they orientate their actions. In other words, any activity is oriented towards a chosen value, without the aspiration of which no activity will take place.

spectrum, applicable to specific action systems.[5] This is one of the reasons for the singular success of "case studies", as it is believed that scientific results applied to a broader field will not work, or be of little use. There is a great variety of theorems, spanning the entire spectrum of theorems(e.g. McGregor's Theory X and Theory Y is a dichotomy, but in fact noone questions that it might be interpreted as a continuum) and eclectic statements (the same problem is solved using theorems that are mutually exclusive).

2.2. Methodological scientific value

Without a doubt, natural sciences today are the most important source and testing ground for scientific processes and their components. The science attributesderived from natural science are a paragon of excellence for non-formal sciences, including MSc. The scientific approach, in terms of methodology, involves primarily the paths and principles for arriving at scientific theorems (substantive content). It is not certain whether MSc has its "own" unique scientific process methodology. It is believed that to a large extent it borrows investigative methods and tools from other sciences. Empirical studies are valued the most, due to the importance attached to verification and positive falsification. There is no satisfactory solution to the problem, which still evokes debate from time to time, of differentiation between MSc and ESc. Generally, MSc is regarded as instrumental towards ESc. In Poland, there is a strong penchant for normative value judgements on what is scientific in MSc, rather than attributing scientific value to competitive theorems and empirical utility (positive argumentation). State accreditation of academic degrees is incomprehensible and results in the fossilisation of hierarchical systems of science management at large. The unsatisfactory level of systematic organisation is found across the board: in language and definitions, logic of scientific procedure, scientific methods, techniques and instruments, as well as scientific procedures.

2.3. Practical utility (utilitarian empirical value)

Business practice needs clear, unambiguous and efficient guidelines on how to succeed. The expectation of recipes for success is a key challenge that MSc has not managed to deal with in a satisfactory manner. The substantive value of MSc results is strongly conditional upon circumstances. If MSc fails to offer reliable and proven scientific theorems and facts, practice turns towards other sources to solve its problems. Practice encounters periodic difficulties and crises, including those of global scope, and does not find sufficient support in MSc. Economics and MSc are viewed as directly responsible for not only ineffective, but also misguided recommendations. This is why practice turns to experiments, simulations, *ad hoc* decisions in circumstances involving above-average risk (gambling of sorts). The development of benchmarking, so-called "best practices", think tanks has been approved by official science. And yet practice reaches further, to non-scientific and unscientific sources and processes (scientific fads; science marketing; scientific grey area; *Sokal Hoax; Bohanon Hoax*). The basic problem is that there is no answer to the question whether it is conceivably possible that MSc could be the panacea, the miracle remedy to effectively solve any problems encountered in business practice. All this in Poland results in the lack of recognition for the management science community and its achievements (including in the field of public management), by the communities involved in politics, power, central and local administration.

2.4. Educational utility (social value)

This value of MSc is related to the propagation of knowledge and its contribution to increasing human potential (human capital) and that of the civilisation. The human potential for knowledge on MSc, and its practical achievements, results as much from the system of professional and public education as from training courses and self-education. The popularity and demand for third-level studies on MSc remain high in Poland. The average level of MSc potential available to individuals and its impact (induction, diffusion) on other areas of life, including households, is no longer felt very strongly. Also the quantitative increase of studies does not translate into improved quality of education in Poland.

2.5. System attributes (systemic value)

MSc as a whole is expected to have all the system attributes, and at the highest possible level. If the term "system" is to be used, we must determine the status of affairs with regard to the "systemic approach" ("systems theory" etc.). As of the beginning of the 20thcentury, this approach, mainly thanks to L. v. Bertalanffy [e.g. Bertalanffy, 1984 edition] aspired to the role of metatheory common for all sciences. These hopes were not fulfilled, though they keep re-emerging [e.g. consilience – Wilson, 2002].

The key system attributes of action systems are as follows: a) existence of a nonempty set, comprised of elements (E) and their properties (P); b) occurrence of relationships (R) among (E) through their (P); c) coherence of the set; d) order within the set; e) interactions with the environment; f) capability of performing given functions or achieving a given goal(s); g) complexity of system attributes, including diversity and randomness of systemic behaviours.

[5]Action system – any system within which people act, starting from individual activity.

It cannot be said that at present MSc has all the attributes of a system at the highest possible level, nor do we know what this highest (or "complete"?) level should involve. The contemporary concept of management science system, in terms of the definition as well as the system setting (content, structure, form), is not clear [Sułkowski, 2005]. It is believed that MSc is in a pre-paradigm science stage, which suggests that the paradigm stage is still ahead. The latter is not well defined. MSc has reached an uneven and debatable level (scope and degree) of system attributes – and it is not certain whether it can be higher and what this higher level were to represent.

To sum up, the total scientific value of the MSc system is to a large extent under-determined and debatable.

3. Management science systemframework

Based on an earlier development [Sławińska, Witczak, 2008], I present the management science system as a framework (fig. 1).

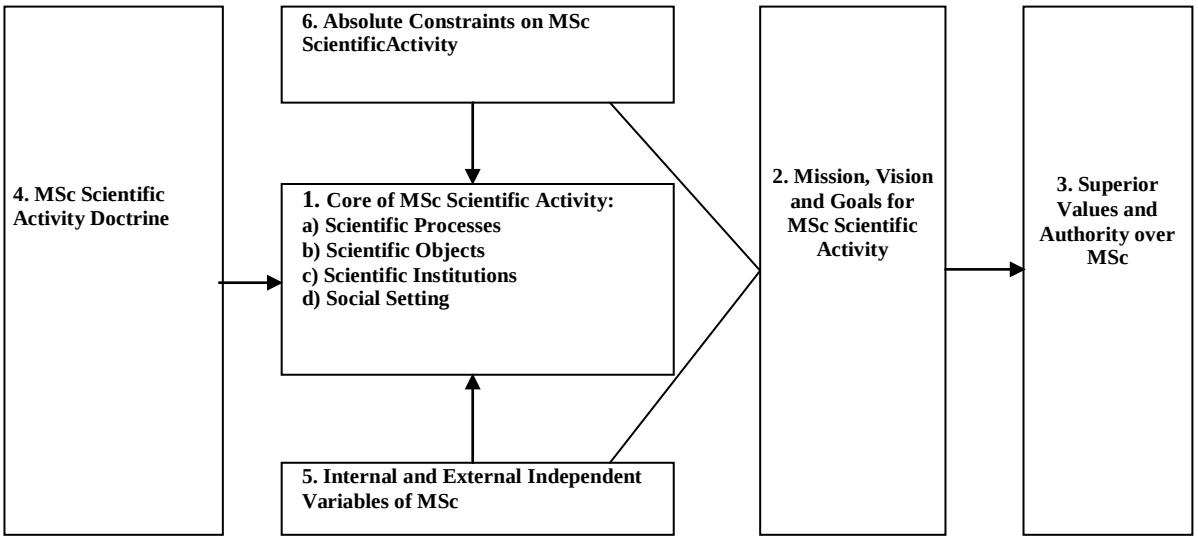

Fig. 1. Management Science (MSc) System
Source: own work based on [Sławińska, Witczak, 2008].

The most important subsystem in the management science system is the "core of scientific activity", represented by an arrow in fig. 1 (block 1). Its point, not described, contains a bundle of operational and substantive objectives and at the same time direct results of the scientific process. Substantive objectives are a key category, as they are some of the main variables co-determining the scientific activity subsystem as a whole. The core by nature has all the attributes of a system, though at a lower level. Its complex structure includes: a) scientific processes (fundamental; auxiliary; managerial; communicative; economic; formative); b) scientific objects (involved parties, resources and other elements without which no scientific process can take place); c) scientific institutions (regimes, organisational structures; management systems); d) social setting of MSc (beliefs, emotions, academic culture). Aggregate variables, co-determining the core of scientific activity, are other variables surrounding the core, presented in other blocks in fig. 1. In other words, the "MSc system" at the highest level and as a whole is an arrangement of six aggregate subsystems (blocks 1 to 6), with the "core of scientific activity" occupying the central place among them (block 1). Blocks 2 to 6 surround the core and interact with each other to affect its content, structure and form.

Let us consider the relationships among the subsystems using an example. The "Manhattan Project" [*Manhattan Engineering District* (MED), 1942] is a typical example of a scientific undertaking that combines all the stages (CARNI – (C)ognitive; (A)xiological; (R)esponsive; (N)ormative; (I)mplementative). The core of scientific activity accounted for a complete subsystem whose objective was to effectively solve a substantive scientific problem: "how to build an atom bomb" and – as a result – create a scientific fact in the form of an effective atom bomb (scientific substantive functional goal). The mission, vision and strategic goals of this project (higher management level) were focused on solving a functional, scientific and empirical *strategic problem*: "how to gain effective military advantage in military action" and – as a result – creating an empirical and scientific fact in the form of effective military advantage (Little Boy – Hiroshima and Fat Man – Nagasaki). One feature of the scientific military problem at the strategic level was that the "Manhattan Project" was pursued alongside other competitive projects and in the midst of an ongoing war. It was a

competitive element of the game in a portfolio of scientific, scientific-empirical and empirical (non-scientific) activities. Finally, at the highest level (the ultimate justification of a given scientific activity), we are dealing with attempts to solve a scientific-empirical *political problem*: "how to apply innovative and effective military means to achieve world peace" and – as a result – create an empirical-scientific fact in the form of achieving world peace.

The above reasoning leads me to several conclusions. Values and goals create an *aspirational subsystem* of a given scientific activity (scientific substantive values and functional goals, strategic values and goals and political values and goals). The remaining (other than values and goals) content, structure and form of the subsystem is derived therefrom on four levels: *operational*, *tactical* (transition between the operational and strategic level), *strategic* and *political*. The aspirational subsystem is in fact the driving mechanism (value, motivation) of the scientific process.

Thus, we begin to see a hierarchy of subsystems in the MSc scientific activity: *MSc scientific policy subsystem*, *MSc scientific strategy subsystem*, *MSc scientific tactics subsystem* and *MSc scientific operations subsystem*.

The MSc scientific policy subsystem determines and justifies the other levels and includes, without being limited to: a) superior values of the scientific process (block 3 in fig. 1); b) principles determining authority over MSc scientific process (block 3); c) superior content, structure and form of the scientific system doctrine, as a whole including assumptions regarding the foundations of all the other blocks (block 4).

In this way, the MSc scientific policy subsystem paves the "MSc path", to use a parallel with Sun Zu [Sun Zu, Sun Pin, 2004]. On the other hand, the scientific strategy in MSc is an endless game in response to changing subjective and objective circumstances to realise the scientific mission, vision of goals, and implement the MSc policy.

The interdependence of the blocks of the "MSc system" may lead to short- or long-term dominance of one or several blocks, or to an "interstage crossing in scientific activity".[6] For instance, if scientific doctrine prevails, with its often arbitrary foundations, scientific dogmatism may emerge, with all its consequences (distortions...). The "interstage crossing" means, among others, that the scientist or the research manager does not have a clear or indeed any investigative approach. This may lead to "scientific drift".

System attributes are not only about a narrowly-defined interaction between a given scientific activity and narrowly-defined environment. Systemic interactions also involve the interdependence of the core of scientific activity, and other subsystems, with the environment at large. The latter includes the parallel (horizontal), past and future environment, as well as the concentric environment,[7] e.g. mutual diffusion and inducing changes in other disciplines, fields of practice etc.

4. Differences between natural sciences and MSc

4.1. Differences of scope

Below I am presenting a matrix which makes it possible to study the differences in scope of sciences investigating natural systems, tangible systems and virtual systems.

Tab. 1. Categories of existing systems vs. levels of reality

Specification		**Categories of Existing Systems**		
		Natural Systems	**Action Systems**	**Civilisation Systems (mixed)**
Level of Reality – Tangible to Virtual Continuum	**Exclusively Tangible Systems**	**Yes** Exist and are subject to investigation	**Do not** exist; every such system has virtual and intangible components	**No** Do not exist and are not subject to investigation
	Exclusively Virtual Systems (including transcendence)	**Do not** exist (?; e.g. spirit independent of matter)	**No** (every action system is founded in reality – there is no exclusively virtual system)	**No** (every civilisation system is founded in reality – there is no exclusively virtual system)
	Mixed Systems (including transcendence in human and collective mind)	**Yes** Exist and are subject to investigation – albeit with the	**Yes** Exist and are subject to investigation (human	**Yes** Exist and are subject to investigation

[6] Stage – a set of behaviours and activities which are clearly distinct from others. For instance, "positive cooperation" is a stage that is clearly different from the stage of "negative cooperation".

[7] Concentric integration – relationships with the environment which do not rely on the supply, sale, competition, but instead technologies, outcomes of collaboration, etc.

		assumption that virtuality applies to animal "minds"	consciousness, as a component of the human body and behaviours)	

Source: own work.

Material references of natural sciences and MSc are somewhat different. Nature has other attributes than artefacts, including virtual artefacts. The main difference is that nature is independent of people and develops according to principles that we are in the process of discovering, and which operate in a broader spacetime in a more long-lasting manner. Ultimately, also the scope and longevity of the process and its result are different – the canon, or paradigm of those sciences is appropriate. Another important aspect is whether the scholar is able to measure a given thing, which is not entirely possible with regard to the virtual world. The system of nature develops in an evolutionary manner, as a wholewith a multifaceted structure. On the microscopic as well as macroscopic level we find natural elements, entities and individuals, which to a large extent have the properties and integrity of machines. The variability of macroscopic machines can usually be observed in the secular period, and their boundaries are relatively unambiguous, like those of macroscopic ecosystems. The latter, in spite of considerably enhanced amechanistic and probabilistic properties, may be successfully studied using stochastic principles. All this enables natural sciences to discover their nature and derive theorems with the status of laws.

The material scope of MSc is not so easily recognisable. Action systems and civilisation systems are autopoietic (self-organising), open, fuzzy, hybrid and variable. Also, uniquely, their behaviours are purposeful. Even though their fundamental element – the human being – is a biological machine, it is so complex that we are still not able to explore it fully, also in terms of biology. Civilisation systems are permanently *in statu nascendi* across all structural levels. On the supramicroscopic level action systems develop to a certain/large extent in an evolutionary manner. The range and number of degrees of freedom in behaviour and action at every level is indeterminate. Such systems may, by analogy, be compared to a living and breathing, constantly swelling ocean of varied depth/shallowness.

Globalisation of action systems brings about the colonisation of natural systems, which by being a sort of agar (growth medium) is subject to gradual depletion. The scientific inquiry and definition of civilisation systems, whose properties combine natural systems and action systems poses special challenges for MSc.

4.2. Differences of science requirements

The matrix in tab. 2 presents a comparative analysis of management scienceversus natural sciences, in terms of science requirement categories. The columns present the applicable requirements of natural sciences and those of MSc, plus the comparison.

Tab. 2.Differentiation of Science Requirements

No	Conformity of Requirements of Sciences Categories of Science Requirements	Requirements of Natural Sciences – Prevailing Requirement Model	MSc Requirements	Conformity of MSc Requirements to Model
1.	**Science System Setting**	Same as in fig. 1	Same as in fig. 1	1. Complete conformity of categories in setting
2.	**Scope of Scientific Goals**	1. CAR[8] 2. To a certain extent NI (e.g. GMO[9])	1. Mainly I 2. To a large extent C and N 3. Considering R 4. Questioning A	1. CR 2. To a smaller extent ANI
3.	**Scientific Attributes of Problems Handled**	1. Non-triviality, pertinence and scientific progress	1. Same as in natural sciences	1. Complete conformity

[8] References to CAR; CR; I; and other – respectively, as components of CARNI.
[9] GMO – Genetically Modified Organisms.

4.	**Scientific Methodology**	1. Language, logic, methods, tools and scientific procedures 2. Objectivity, rationality, trueness, corroborability	1. Same as in natural sciences 2. Significant element of subjectivity, irrationality, distortions of truth and corroborability	1. Aspiration to complete conformity 2. Permanent inability to achieve conformity with requirements of natural sciences
5.	**Attributes of Objects under Scrutiny**	1. Singular, relatively permanent and stable system of nature	1. Singular, relatively ephemeral and unstable system of civilisation	1. Specifics – different attributes 2. Scope – wider material scope of MSc 3. Longevity and stability – smaller in MSc
6.	**Categories of Scientific Results**	1. Expected and delivered: laws and regularities of significant scope	1. Expected: laws and regularities – delivered: regularities, principles, guidelines of smaller scope	1. Impaired ability to generate laws 2. Diminished scope of regularities, principles and guidelines 3. Results are strongly dependent on stage in life-cycle and development of objects handled
7.	**Scientific Value of Science Results**	1. High substantive, methodological, empirical, educational and systemic value	1. Scientific value constrained by singular and distinctive properties, location in spacetime 2. Diminished substantive, methodological, empirical, educational and systemic value	1. Diminished scientific value – ***scientific value gap?***

Source: own work.

The above comparative analysis leads me to the following general conclusions. Firstly, there is a natural "scientific value gap" between MSc and natural sciences, currently regarded as model science. Of course, the term "scientific value gap" makes sense only if there is no debate as to the value of the model itself – i.e. natural sciences. I am trying to defend a hypothesis that natural sciences may not serve as such a model, and also that such a model does not actually exist. Admittedly, one may not neglect, or ignore, the scientific excellence of natural and formal sciences, mainly bearing in mind their century-long tradition and experience. Similarly, one may not dismiss the significance of universal principles governing research activities, necessary in any domain of science. I use the term "natural gap" because there are insurmountable idiosyncrasies of science in a given domain (field of scientific activity). The characteristic properties of a given domain and its surroundings (context and circumstances) are some of the main determinants of realisability (possibility, sense and feasibility) of scientific processes in that domain. In other words, each thing (area, discipline, field) calls for adequate science principles.

I believe that within this meaning the term "gap" is not justified here, and also that it is not possible to eliminate the scientific value gap, if we are to stand by this term. It means that after more than a century, MSc has reached the highest level of scientific maturity. In light of the factors described above it will never be higher, as a matter of principle. I also believe that H. Koontz's "management theory jungle" is a description of a singular constant status quo, so – as a matter of principle – it will never be any different. Nevertheless, there is no valid excuse, including the above reasoning, that would warrant abandoning the efforts for pursuing excellence in MSc science requirements.

These premises can only lead to one conclusion: it is necessary to formulate (reconstruct, define) a specific science and metascience paradigm for MSc.

5. MSc as a system – the general approach

5.1. Singularity and distinctiveness of MSc as a whole

Our ability to control the functioning and development of civilisation systems is, and will always be, limited and suboptimal, for reasons including their inherent characteristics.

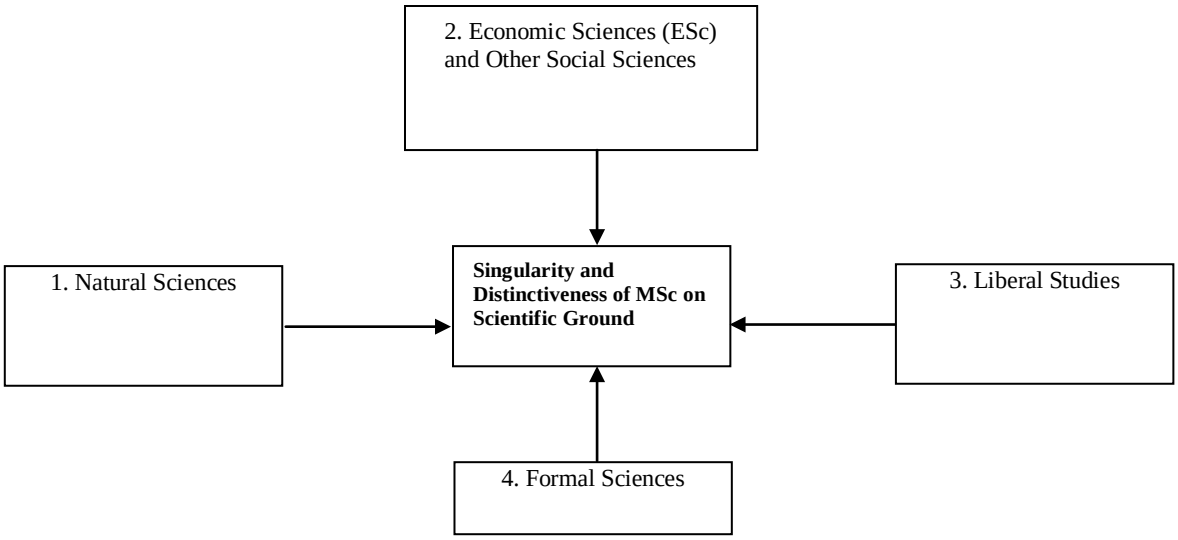

Fig. 2.Differentiation Between Management Science and Other Sciences
Source: own work.

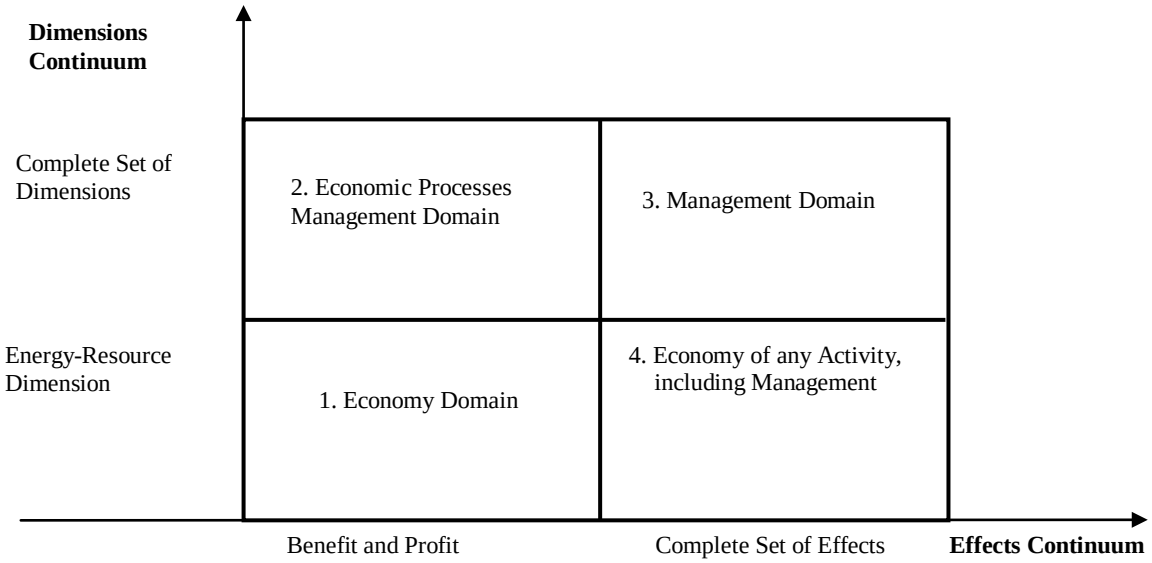

Fig. 3.Domains of Management and Economy
Source: own work [Sławińska, Witczak, 2008].

According to R.W. Ashby's law of requisite variety, the efficiency of the management subsystem, which is part of the civilisation system, must always be imperfect because its variety is less than that of the system. The hybrid nature of civilisation systems warrants an assumption about the applicability of other laws, formulated in natural and formal sciences, such as: a) W. Heisenberg's uncertainty principles (it is impossible to determine simultaneously the position and momentum of a particle); b) W. Planck's constant (there are length and time limits in the microworld, below which investigation is impossible); c) K. Gödel's theorem (a given system cannot be described using its own categories [by itself]).

In this light, the relationships between MSc and other sciences are apparent: MSc cannot develop without input from other sciences, and reciprocity is not excluded (fig. 2). The relationship between MSc and ESc is of special significance, as the latter underscore the significance of economic efficiency and rationality in civilisation systems.

In turn, MSc deals with all the principles governing civilisation systems (fig. 3). The economic domain focuses on the dimensions of energy and resources, as well as benefit and profit. In contrast, the domain of MSc includes all dimensions, and the complete set of outcomes arising out of the actions of civilisation

systems. In this context, there is no doubt that when dealing with systems oriented towards economic surplus, as the superior value, ESc are an important point of reference for management. Irrespective of the above, economic surplus is of key importance (as a prerequisite for longevity) for all civilisation systems, hence the link between ESc and MSc will always be pivotal. The material scope of MSc and ESc includes – and always has – any action system and its components, and not just economic systems (especially enterprises). One should also note that other sciences may supply MSc (address their findings to MSc), and MSc may derive from them, deciding in an arbitrary manner whether these contributions are useful. As a result, theorems of other sciences absorbed in the investigative field of MSc are diverse.

The MSc system chart (fig. 1)may be analysed in light of the above reasoning. The superior value of management is efficiency. Yet its content, meaning – is efficiency as defined by the manager (or stakeholder consensus, etc.). The mission, vision and goals of management (strategic perspective) are a product of navigating change on the path towards the efficiency of the civilisation system. An important role in the MSc system is played by the doctrine of scientific activity, and in it the definition of management and management system. Here, I will use my own concept of management in the broader and narrower sense [Sławińska, Witczak, 2008] and that of management system [Witczak, 2008].

5.2. The general structure of MSc

The internal structure of MSc corresponds to the characteristics of the scope of study – civilisation system (self-organisation, purpose, openness, fuzziness, variability, hybridity). That is why only selected structural areas may be discussed.

Tab. 3. Matrix of management levels and fields in civilization systems

Management Levels **Material Fields in Civilization Systems**	**I. Political Management**	**II. Strategic Management**	**III. Tactical Management**	**IV. Operational Management**	**Synthesis of Material Fields in Civilisation Systems**
1. Systems diversified in terms ofRole in Civilisation Systems: economic; non-economic; mixed; security	1.I. Political management of enterprises...	1.II. Strategic management of enterprises...	1.III. Tactical management of enterprises...	1.IV. Operational management of enterprises...	***1. Management subsystem of enterprise(s), ultimately – economic systems*** **...**
2. Systems Diversified in terms of Spatial Span: local, (...), global	2.I. Political management of a landscape park...	2.II. Strategic management of a landscape park...	2.III. Tactical management of a landscape park...	2.IV. Operational management of a landscape park...	***2. Synthesis of management of landscape park(s)***
3. Systems Diversified in terms of Administrative Range: municipal, (...), global	3.I. Here: political public management...	3.II. Here: strategic public management...	3.III. Here: tactical public management...	3.IV. Here: operational public management...	***3. Public management subsystem of a given political and administrative field***
4. Other Fields, including Metamanage-ment	4.I. Political management of political management - political metamanage-ment...	4.II. Strategic management of political management - political metamanage-ment...	4.III. Tactical management of political management - political metamanage-ment...	4.IV. Operational management of political management - political metamanage-ment...	***4. Synthesis of management of other civilisation systems and management metasystem***
5. Synthesis of Management Levels	***I. Synthesis of political management***	***II. Synthesis of strategic management***	***III. Synthesis of tactical management***	***IV. Synthesis of operational management***	**Total synthesis of management of civilisation systems**

Source: own work.

Row headings in tab. 3 may be altered according to adopted criteria in terms of material scope and objective scope. These criteria are always based on assumptions and may be unique in any particular case.

The field of MSc may cover any material scope and any element of the objective scope – here: that of management level.

In tab. 4, I am presenting a matrix of levels and objective scopes of management. Row headings in table 4 demonstrate that the material and objective scopes of civilisation systems under management overlap. We can study the static organisational structure (objective scope) in an enterprise (material scope). We might as well study the whole management system (objective scope), and not just the static organisational structure, in the same enterprise or in the enterprise as a category (material scope). Similarly, while examining the economy of a given country, as a material scope, we may focus on enterprise management, which will serve as our objective scope.

Table 4. Matrix of levels and objective scopes of management

Management levels **Overlap between the material and objective scopes of civilisation systems**	**I. Political management**	**II. Strategic management**	**III. Tactical management**	**IV. Operational management**	**Synthesis of management system of objective scopes of a civilisation system**
1. *Material scope* any - *objective scope* elementary and local (minimal overlap)	Political management of the enterprise as a category (objective scope) in the national economy as a category (material scope)	Strategic management of the enterprise as a category (objective scope) in the national economy as a category (material scope)	Tactical management of the enterprise as a category (objective scope) in the national economy as a category (material scope)	Operational management of the enterprise as a category (objective scope) in the national economy as a category (material scope)	1. Management system of elementary components of the civilisation system
2. *Material scope* any - *objective scope* in-between other dimensions (considerable overlap)	Political management of Poland east of the Vistula as a category (objective scope) in the national economy as a category (material scope)	Strategic management of Poland east of the Vistula as a category (objective scope) in the national economy as a category (material scope)	Tactical management of Poland east of the Vistula as a category (objective scope) in the national economy as a category (material scope)	Operational management of Poland east of the Vistula as a category (objective scope) in the national economy as a category (material scope)	Management system of the less developed part of the country as a category (objective scope) in the national economy as a category (material scope)
3. Complete overlap of the *material scope* and *objective scope*	Total study and political running of the civilisation system	Total study and strategic running of the civilisation system	Total study and tactical running of the civilisation system	Total study and operational running of the civilisation system	**3. Total synthesis of management of civilisation systems**
4. Management metasystem - the object under control is the management system	***Metasynthesis of political management***	***Metasynthesis of strategic management***	***Metasynthesis of tactical management***	***Metasynthesis of operational management***	**Metasynthesis of the management system of civilisation systems**

Source: own work.

Tab. 5 presents management levels described in the light of categorical components of the MSc system (fig. 1). In each row, the synthesis comprises a system (synthesis) of theorems on the politics, strategy, tactics and operating in individual components of the management system of civilisation systems. Each column produces syntheses of individual management levels across all the categorical components of the MSc system.

Tab. 5. Management levels vs. categorical components of the MSc system

Management Levels **Categorical Components of MSc**	**Political Management**	**Strategic Management**	**Tactical Management**	**Operational Management**	**Synthesis of Categorical Components of MSc**
1. Aspiration Perspective of MSc	1. MSc determines CARNI theorems about the superior values and authority which are the ultimate goal of a given civilisation system or the civilisation system as a category	1. MSc determines CARNI theorems about the mission, vision and strategic goals which are the ultimate goal...	1. MSc determines CARNI theorems about the local games within the framework of the strategy and defining tasks for operational management, which are the ultimate goal of...	1. MSc determines CARNI theorems about the operational tasks ensuring successful performance and results of operations, which are the ultimate goal of...	**1. System of theorems about the aspiration perspective of civilisation systems**
2. Core Structure of Scientific Activity					1. System of theorems about processes, objects, institutions and social setting of management
3. MSc Doctrine		Strategy doctrine			
4. MSc Attitude Toward Independent Variables			Theorems about tactical variables		
5. Confines of MSc					Theorems about confines of MSc
6. Synthesis of Theorems about Management Levels	**Political Management System**	**Strategic Management System**	**Tactical Management System**	**Operational Management System**	**Synthesis of Management Theorems System**

Source: own work.

In table 6, I am presenting my concept for the typology of systems and research trends. I am assuming that in a given spacetime there exists a given whole of systems and research trends of MSc, characterised by similar attributes as the action system (openness...). I am presuming that there is a certain point of departure for the typology reflecting the focus of study in the given spacetime in terms of the level of detail/generality of the studied objects and theorems. There are research trends which specialise in and penetrate detailed and small research fields. There are also generalising trends, aimed at synthesising. At present, scientific syntheses in MSc are not in the forefront, which is due to practical expectations, as well as the predominant paradigm which treats MSc mainly as an applied science.

Tab. 6. An attempt at classifying research systems and trends in terms of scientific comprehensiveness and holistic/atomistic approach

Differentiation Trend: toward narrowing scopes, penetration, increasing MSc diversity	**Mainstream: emanating toward differentiation and/or synthesis, and/or drifting, including outside the scientific field**	**Synthesis Trend: toward generalization and holism, including metaMSc**
1. Managing operations (operational)	1. Sociology of management	1. Systems science, including the management system a) general systems theory b) consilience
2. Managing administration	2. Cybernetics in management	2. Management systems as categories in diverse civilisation and social systems
3. Management optimisation (operational studies)	3. Managing success (Peters & Waterman) and "management best	3. Managing major civilisation systems: a) social; b) globalisation; c)

	practice”	international; d) national economy
4. Strategic management a) planning approach	4. Strategic management a) resource-based	4. Strategic management a) evolutionary (incremental, chaos, paradox, dialectical) b) positioning (strategic fit)
5. Managing objective fields (human resources, production, quality, time, risk etc.)	5. Managing not-for-profit, e.g.: a) regions; b) military	5. Syntheses of science studies about MSc, e.g.: a) G. Hamel, B. Breen; b) S. Sudoł; c) Ł. Sułkowski; d) K. Zimniewicz
6. Managing the involved parties (HRM, stakeholders, agency theory)	6. Managing change a) Organisational Development (OD); Quinn-Cameron Competing Values Framework b) benchmarking; c) organisational game	6. Managing processes a) architecture and synthesis of processes: core, resource-oriented, institutional and social
7. Managing cases a) situational ethics	7. Managing projects (undertakings): a) kaizen, b) lean, outsourcing, downsizing, downscoping, alliance, consolidation/fragmentation	7. Autopoietism
	8. Managing processes, e.g.: a) Six Sigma; b) BSC; c) BPR	
	9. Public management	
	10. Anthropomorphism in management a) knowledge management b) managing an intelligent organisation; c) managing a metaphoric organisation (theatre, virtual, hypertext, fractal); d) cognitivism	
	11. Value-based management (VBM)	
.....	12. Managing “by”, e.g.: a) values; b) objectives; c) other	.....

Source: own work.

I believe that the approach presented in tab. 6 is perfectly natural and to a large extent due to the singular nature of action systems, as I have already noted. In my opinion this adequacy of MSc is universal as a matter of principle. How we classify and allocate individual research systems and trends will be diverse and variable, depending on changing paradigms and principles of accumulating scientific knowledge.

5.3. Forms of scientific theorems and forms of scientific activity

I differentiate four “*forms of scientific theorems*”: from an idea (thought), through concepts (developed and justified ideas), scientific theories (developed and verified/falsified concepts), to scientific paradigms (the highest level of science, generally approved by the academic community). “*Forms of scientific activity*” are: research efforts (any unelaborated scientific activity), scientific directions (organised around values and objectives), scientific schools (organised around research centres), scientific approaches (organised around methodology), to research trends (multi-faceted scientific activity in a given scientific field).

Tab. 6. Forms of Scientific Theorems and Forms of Scientific Activity

Forms of Scientific Theorems **Forms of Scientific Activity**	**Scientific Idea**	**Scientific Concept**	**Scientific Theory**	**Scientific Paradigm**	**Forms of Scientific Activity System**
(Individual) Research Efforts		Collection of concepts in a given scientific effort			**Collection of theorems produced by scientific efforts**
Scientific Approaches		Collection of concepts in a given scientific approach			**Collection of theorems produced by scientific**

					approaches
Scientific Directions		Collection of concepts in a given scientific direction			**Collection of theorems produced by scientific directions**
Scientific Schools	Collection of ideas in a given scientific school	Collection of concepts in a given scientific school	Collection of theories in a given scientific school	Collection of paradigms in a given scientific school	**Complete set of theorems of given scientific schools**
Scientific Trends		Collection of concepts in a given scientific trend			**Collection of theorems produced by scientific trends**
Systems of Science Theorem Forms	**Subsystem of Ideas**	**Subsystem of Scientific Concepts**	**Subsystem of Scientific Theories**	**Subsystem of Scientific Paradigms**	**Total Synthesis of Science System**

Source: own work, Cf.: Witczak H., (2013), *Wstęp do naukowego statusu koncepcji zarządzania*, PUE scientific conference, Poznań.

6. Internal structure of the MSc system

6.1. Aspiration perspective of the MSc system

The aspiration perspective of the MSc system comprises three elements: a) direct (operational) values and objectives of the scientific process with regard to the management of civilisation systems; b) mission, vision and strategic as well as tactical goals of civilisation systems; c) superior values and authority in civilisation systems. Table 7 below presents examples of such a perspective, without exhausting all the possibilities subject to investigation.

Table 7. Aspiration perspective of the MSc system – a comparative example

No	**Aspiration perspective of chosen activities** **Chosen activities**	**Direct values and objectives (operational)**	**Mission, vision and strategic as well as tactical goals**	**Superior values and authority (political)**
1.	Non-scientific AS – training conducted at an enterprise	1. Number of people trained 2. Level of competence of the people trained	1. Performance of the people trained 2. Profit of the enterprise	1. Competitive edge of the enterprise 2. Longevity of the enterprise
2.	Scientific AS in MSc – empirical study of the relationship between business growth (independent variable), and organisational development of the business (dependent variable)	Establishing positive theorems of diverse scope (idiographic, etc.) about the relationships between the variables	1. Recognition of operational findings by the academic community as a lasting contribution to the canon of MSc theorems 2. Absorption into business practice of operational theorems based on the studied relationships	1.1. Recognition of the author(-s) of the study in the academic community and achieving the status of (an) influential MSc scholar(-s) 2.1. Developing ties between the author(-s) and business practice

Source: own work.

Similarly, we can differentiate three aspiration perspectives for MSc: operational (operational CARNI scientific aspirations), strategic (strategic and tactical CARNI scientific aspirations) and political (political CARNI scientific aspirations). The aspiration perspective, in terms of scope, categories and content of its elements, has the characteristics of an action system (fuzzy...). MSc aspires to conduct scientific operations in CARNI domains aimed at formulating theorems and scientific facts about the aspirations of action systems. The aspirations of action systems must be viewed from an egocentric perspective and from the perspective of interactions with the environment. Table 7 contains examples of the former. Each of the categories of values and objectives may also bear upon the environment. For instance, the number of graduates and their level of competence may have impact on the reputation of an educational institution among prospective students. The graduates' employability and careers may affect labour relations and responses. Ultimately, profit, prestige,

etc., are not only sources of egocentric satisfaction for the owners and benefactors, but also contribute to GDP growth. The relationships between values and objectives, egocentrically or vis-à-vis the environment, may assume diverse functional arrangements and with varied probability, and their set is open. Causal relationships may, or may not, prevail.

The above description, by analogy, applies to other categorical elements of the MSc system. The operational perspective of MSc (investigating, with its immediate objectives and results) is subordinated to the strategic and political perspective. In science, as in business (for-profit systems), non-profit systems, and mixed action systems (mixing profit and non-profit), various strategies are possible. Variables of special importance, which help determine strategies in MSc, are the type of scientific system and its regime in terms of its attitude to economic surplus and supply. The strategic aspirations of scientific systems, involved in basic scientific activity, reflect their egocentric interests and strategies, and are founded on blocks and components of blocks as shown in fig. 1.

I differentiate the following primary types of strategies important for MSc.

1) Teleology-oriented strategies, where ***aspirations are the dominant factor*** driving scientific strategy – blocks 1 and 2. When taken to the extreme, they may lead to scientific research based on the principle "the ends justify the means".

2) Technocracy-oriented strategies, where the ***coreof scientific activity prevails*** – block 3. Excessive technocratic purism may hamper progress in scientific debate, by extending project durations and inflating research budgets.

3) ***Doctrine-oriented*** strategies (block 4), with prevailing beliefs and opinions about the principles for pursuing MSc. Doctrines are necessary, but if given too much importance, they may hinder progress in science, too.

4) ***Situation-oriented strategies***, which means that responsiveness and/or proactivity are favoured in response to the scientific strategic situation – block 5. Situational ethics, within this meaning, have their advantages, as the research is closely adapted to the specific circumstances. On the other hand, this approach has plenty disadvantages, too, for instance: it hinders arriving at and accepting generalisations; delays publication of research findings; procrastination.

5) ***Orthodoxy-oriented strategies***, which accentuate academic rigour and prudence, linked with legal, ethical, cultural orthodoxy. The results may include perceived dichotomies in science ("black-and-white"), excessive constraints on the freedom of scientific inquiry, academic exclusions (ostracism), etc.

6) ***Mixed strategies*** (combining all strategies, in various proportions). Without a doubt, this is the prevailing approach in practice. It is important that the mixed strategy be nevertheless a deliberate one, with a leading role for one of the superordinate variables, to avoid scientific drift.

Logically speaking, we can quote the concept developed by J.Ch. Jones. He identified four types of strategies,[10] based on two criteria: the degree to which activities had been planned in advance and the pattern of exploration. He found the following models of strategies: linear, cyclic, branching, adaptive and random. Strategies planned in advance (linear, cyclic and branching) are better suited to situations that are already familiar. In the adaptive strategy, only the first move is pre-determined from the start, and each step thereafter depends on the outcome of the preceding one. Random searches, currently referred to as multi-modelling, or puzzle strategies,[11] are related to heuristics, where problem-solving in view of the wide field of uncertainty commences with a randomly chosen problem. After it is solved, one moves on, randomly, to other problems, gradually decreasing uncertainty, and getting closer to the ultimate solution. Moreover, J.Ch. Jones also differentiated strategy control methods, i.e. self-organising design systems, which are intended to evaluate strategy as a whole in relation to external criteria, and to evaluate partial results of the strategy itself.

There is no doubt that in MSc, like in all social sciences, political aspirations and strategiesplay a vitally important role. It is particularly visible because "management" deals directly with values (desired states of affairs) and shaping authority. This is one of the reasons why theorems of individual scholars differ, even though many elements of the scientific process are identical.

6.2. Core structure of scientific activity (block 3 in fig. 1)

The core scientific activity of MSc comprises scientific processes, scientific objects, scientific institutions and social setting of scientific activity. In terms of component categories, the core is identical to the core structure of the object of management (civilisation system).

In particular,the objects of the scientific process in MSc are any elements of the AS management subsystem and the AS management subsystem as a whole.

[10] As cited in: H. Witczak, *Natura...*, op. cit. Cf.: J.Ch. Jones, *Design Methods*, John Wiley & Sons Ltd., London, 1970.

[11] Ł. Wacławik, *Strategia czuwania – metoda antycypacyjnej analizy otoczenia konkurencyjnego*, in:*System informacji strategicznej. Wywiad gospodarczy a konkurencyjność przedsiębiorstwa*, R. Borowiecki, M. Romanowska (ed.), Wydawnictwo Difin, Warsaw 2001, pp. 123-128.

6.2.1. Scientific processes of MSc

The basic scientific processes of MSc cover the entire scope of CARNI activities.

Table 8. Core structure of MSc founded on basic scientific processes

Categories of basic scientific processes	**Scientific objects serving those processes (made up of process components)**	**Scientific institutions conducting these processes**	**Social setting of basic processes of MSc**	**Operational scientific results of basic processes**	**Row synthesis – subsystems of individual basic scientific processes**
1. (C)ognitive processes 2. (A)xiological processes 3. Processes shaping the approach to (R)esponding 4. (N)ormative decision-making processes 5. (I)mplementative processes	CARNI 1. Scientific activities 2. Methodology of cognitive scientific inquiry 3. Other auxiliary scientific activities and their methodology 4. Scientific resources 5. People – researchers 6. Object of inquiry	CARNI regime, dynamic and static organisational structure	CARNI values, interests, emotions, culture (et al.)	CARNI theorems and scientific facts about managing civilisation systems	Synthesis of scientific CARNI processes and their results
Synthesis of basic processes of core MSc	Synthesis of scientific objects of core MSc	Synthesis of institutions of core MSc	Synthesis of social setting of core MSc	Synthesis of scientific results of core MSc	**Total synthesis of basic core MSc subsystem**

Source: own work.

I consider scientific processes to be the basis founding the core of MSc system. The primary source of those processes, though not the only one, are scientific aspirations. All the variables of the remaining blocks of the MSc system contribute to the development of scientific processes. For instance, the introduction of grants into Polish science (a variable in block 5 – situation of MSc), has led to the development of various auxiliary processes in the core of scientific processes, which were absentbefore. Consequently, our attention is drawn to other processes, necessary to conduct the basic processes, which ultimately add value to science. Those other processes do not immediately add value (new theorems and scientific facts), but without them conducting science would be all but impossible. They include processes supporting science (e.g. instrumental support), special managerial processes in science (e.g. research modelling), communicating in science (for instance, publication of research findings), science economics (e.g. research budgeting), exchange and transactions in science, co-existence in science (competition), and self-organisation in science. The relevant objects, institutions and social setting are absorbed within the framework of basic scientific activity, or create their own structures and subsystems.

6.2.2. Scientific objects and institutions of MSc

Scientific inquiry gains its object-focus when processes are saturated with action factors. These include, without being limited to: the parties involved in scientific activity; objects of scientific activity; operations performed in the course of scientific activity; approaches and methods in scientific activity; tools used in scientific activity; resources used in scientific activity – all of them allocated in a given TS (spacetime). These scientific objects, fully saturated with scientific action factors, are ready to undertake operational scientific activity. It is impossible, however, without an "institutional superstructure", colloquially speaking, imposed on the object. The term refers to regime, organisational structure, standards of conduct, regulations and guidelines of the science system, without which it is unable to meet the requirements of congruence and, consequently – be a party to laws, obligations and responsibilities in relations with other systems (with the environment).

Such institutionalisation applies to all the elements of the object, though on different principles (e.g.: level of detail, scope, etc.). It is, at the same time, an internal situational variable for the party conducting scientific activity. Excessively rigorous regulation of the internal scientific potential may cause a range of different responses from those entities. And so, assuming that blocks 1 through 4 and 6 are held constant (*ceteris paribus*), the entity may respond differently to an external situational variable (block 5). "Extensive and rigorous control" of internal regulations by the environment of a given scientific system may result in

strongly orthodox scientific strategies. In turn, weak external control, in this situation, may bring about mixed behaviours (including strategic drift), or ignoring the control. However, if we waive the *ceteris paribus* assumption, a scientific strategist appropriately motivated by doctrine ("the law must always be observed") will still lean towards the orthodox scientific strategy.

The principles of economics in science play an important role, reaching beyond object-orientation and institutionalisation. They are decisive in supplying scientific systems and allocating their economic surplus. Here, I am making a doctrinal assumption that any action system, including a scientific system, must generate economic surplus in the long term. Otherwise, it must collapse and cease to exist as a social entity. The main, and ultimately decisive source of such surplus is the environment.[12]

With such an assumption, no scientific system can survive unless it generates such surplus, regardless of the source or basis. The scientific system can operate on a for-profit basis (enterprises), that is when the economic surplus is the main reason, motive, value and goal of its existence, on self-supply conditions. For scientific systems, this is a very tough requirement to meet. It means that the entire scientific activity and its results must be priced in such a way that operating and development costs are lower than revenues generated (benefit), and also that revenues from operations divided by the costs exceeded one (profit). The operational objective of science, however, as a matter of principle, is not economic surplus, but solving a given scientific problem (-s) – scientific problem portfolio. Then, based on our assumption, the scientific system still has to generate the economic surplus, but not necessarily based on the same principles as an enterprise. Not self-supply, but supply, which means that not all revenues originate from scientific activity, and the generated costs must be covered from other sources. Admittedly, this entails a lack of the necessary causal relationship between energy input (labour, capital, emotion, etc.), and the results. Also, the mechanism for covering costs and expenses remains problematic – if they are not paid for by (scientific) operations, then how? Is it at all possible, and if so, what is the best way? More importantly, economic surplus significantly changes its role here: it must be not so much generated, as provided, and not as a value and superior goal (motive), but as a requirement, condition, or constraint. Similar, and also other additional, problems are generated by mixed solutions to this problem.

I am claiming that the strongest motivator for any activity can be found in strategic and political values, of a higher order than operational values, provided that they are unambiguously, directly and strongly linked to the reasons for pursuing the latter. An operational value for a scholar may also be strategic and political, and they are willing to work without any regard for the economic surplus. Putting willingness aside, however, the economic surplus must be ensured, if not by own enterprise, then by other sources, not directly linked to the operational outcomes of science. Sponsors, donors, "business angels", et al. – these mechanisms should be considered from the perspective of the principles discussed herein. Nonetheless, the best solution is to operate MSc based on the principles of an enterprise wherever possible,[13] including by enterprises whose core business is in non-scientific activity. The state and other public entities may be responsible for independent operational scientific activity, but, as a matter of principle, as a last resort. This is mainly due to the insufficient congruence and motivation of state entities. Mixed principles may also come into play (PPP – public-private partnership), and fields which hold no motivation for other scientific entities. As a matter of principle, it is also necessary to build such a structure of the science system which will ensure absolute congruence, cause-and-effect relationships oriented toward scientific substantive effects, and regulation through competition and specialised regulatory systems. Their absence or weakness may lead, for instance in the case of certain doctrines, to the development of unscientific mechanisms, including the so-called parascience (e.g. sycophancy). The state and other public entities may in turn successfully perform functions other than operational in science.

The AS flow chart (fig. 1) shows that for MSc, too, scientific processes are of principal importance, followed by scientific objects, and only lastly – scientific institutions. Pushing institutionalisation to the forefront, with its comprehensive parametric assessments and others, obstructs scientific processes, including motivation mechanisms. Research findings do not fall out of the blue sky, the process and motive always come first. Summing up: institutions must be shaped according to the principles supporting processes and objects, and regulating them. The latter function, part of specialised science management, must not occupy a prevalent position in the science system. It upsets the necessary equilibrium and contradicts the rule whereby basic scientific processes of MSc should prevail.

The development of MSc does not take place in a civilisational vacuum. Various stakeholders are interested in the activities and influencing (creating, existing [exchange, co-existence, self-organising], atrophy, changes) science. Without a doubt, the general values and goals pursued by science include: 1) dissemination of its results in the civilisation system, and enhancing its potential; 2) developing the potential of science itself, for the good of the civilisation system. Scientific processes, objects and institutions should be driven in this direction, based on foundations including the doctrine whereby science has a role to play in

[12] I present evidence for this in: Witczak, H. (2008), *Natura…*, op. cit.

[13] The basic problem, apart from those listed above, is the assessment and pricing of scientific activity, in all its aspects, both those viewed as negative (price of the outlay, cost, expenses) and those viewed as positive (price of the scientific products and services).

enhancing the potential and benefit of the civilisation system. There is no straight answer to this question, hence it is necessary to make *a priori* assumptions (doctrine). The influence of science on the non-scientific sphere of the civilisation system is not always obvious (it is difficult to establish direct and obvious impacts; impact is delayed in TS, etc.). Expectations of exclusive and immediate empirical results (expectations on the part of organisational and management practice) are unjustified. The problem, with chaotic, dialectic, paradoxical and dilemmatic properties, is how MSc is to achieve purely scientific and utilitarian values and goals at the same time as having to generate economic surplus. One of the solutions is for business practice to support the development of MSc.

It is impossible to discuss all the elements of the object-orientation and institutionalisation of MSc. Below, I am only addressing approaches to and sources of scientific theorems.

Scientific approaches are one of the forms of scientific activity. Due to the specifics of action systems and MSc, there are practically no constraints on the possible investigative approaches, as long as they meet the requirements of the (applicable) science paradigm. I shall put "applicable" into quotation marks, seen as the scientific approach may conflict with the "applicable" paradigm (e.g. Copernican system), while fully complying with science requirements. This is characteristic of scientific breakthroughs which deserve special attention. The "mathematical approach" in economics holds an important place, but is not generally accepted. The "praxeological approach" in MSc is the greatest achievement of Polish science on organisation and management. It is not very well known in the global science market (diffusion of scientific theorems; science marketing…), and in today's Poland it seems rather outdated…

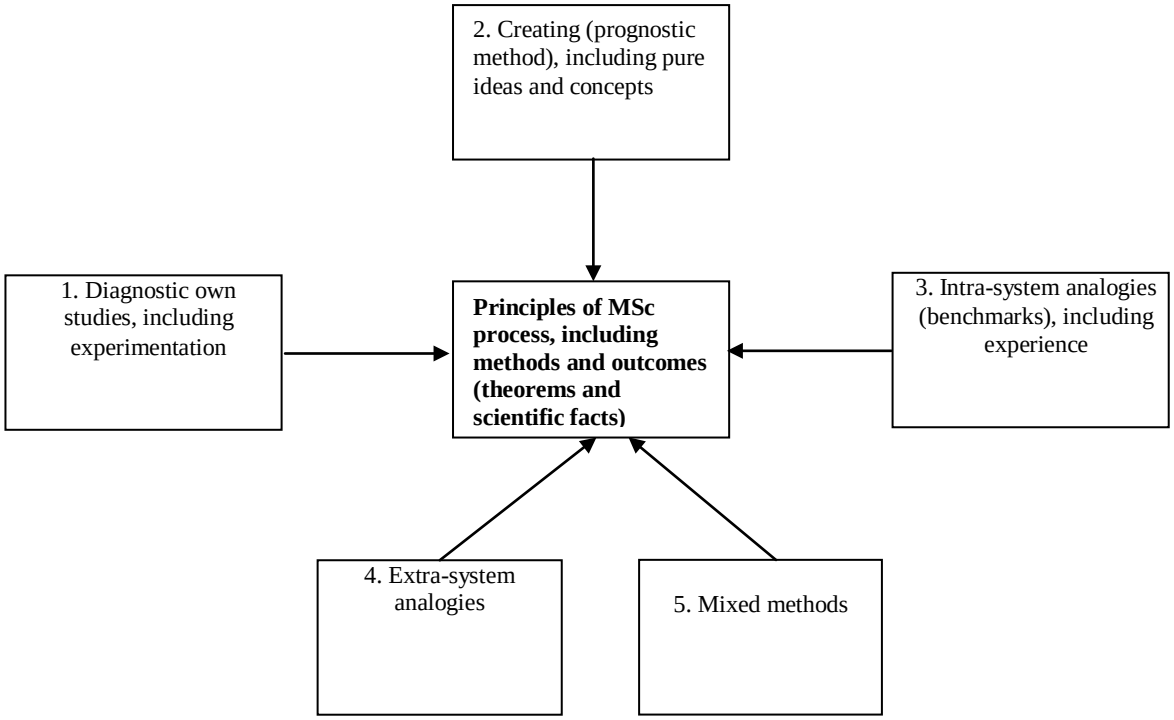

Fig. 4. Methods of MSc

Source: own work.

Research methods are object-oriented elements of science. Sources of scientific theorems are presented in fig. 4. There are four basic methods of MSc, assuming that a method is a consciously and repeatedly used way of identifying and solving scientific problems, via CARNI processes. The problems may be of local nature (C, or A, and others respectively), partial (for instance CAR, respectively) and total (CARNI). For the sake of example, let us consider a total CARNI scientific process, such as a progressive change (improvement). It starts by recognising the actual AS status and conducting cognitive (C) scientific operations. Then the currently existing management solutions are assessed, and results of diagnosis are balanced (CA) to create input for Responding (R). In the course of the diagnostic balance, the content and category of the problem at hand is defined, among other things. Problem category may range from the lack of negative findings (no areas for improvement), through to recommending immediate, complete and radical improvements. In the subsequent step (approach to responding – R) principles governing the approach to improvements are defined, including the path towards the improvement master model. One of the crucial subproblems in terms of R, is the choice of the master modelling method, unless this has taken place earlier,

preceding the entire process, i.e. prior to cognition (C). It is not at all obvious that the further steps in the scientific process will be consistent with the logic of diagnostic master modelling method. It may turn out that theoretical models are proposed in existing literature, or that one's own heuristics seem very promising (source 2 – prognostic method for master modelling). Alternatively, there may be various intra-system analogy sources (for instance some forms of benchmarks – source 3). In MSc, it is exceptionally rare that we deal with extra-system analogies, e.g. originating in nature (source 4). In such situations, after the scientific problem is formulated, we abandon the pure diagnostic method and choose one of the other pure methods. In practice, we deal with mixed methods, for instance diagnostic-prognostic, or prognostic-diagnostic, etc.

6.2.3. Social setting of MSc

Scientific research in MSc is a category of action systems, thus mechanisms relevant for those systems apply. Science requirements are one thing, but the actual reasoning process and behaviours in science – quite another. By analogy, the following strategic responses in reasoning and inference in MScmay be proposed (tab. 9).[14]

Table 9. Typology of strategic responses in MSc according to type of reflection

Specification		Types of reflection used in reasoning and inference					
		Rational	Non-rational			Mystical	Mixed
			Emotions	Intuition	Hope	Faith	With Ratio / Without Ratio
Level of reflection (range and depth)	Automatic response	Trained automatic response	Urge, impulse response	Premonition, instinctive response	Automatic hope response	Automatic faith response	Comprehensive automatic response
	Automatic-reflexive	Rational automatic-reflexive response	Emotional automatic-reflexive response	Intuitive automatic-reflexive response	Hope-based automatic-reflexive response	Faith-based automatic-reflexive response	Comprehensive mixed response, contextual structure
	Reflexive	**Deliberate rational response**	Deliberate emotional response	Deliberate intuitive response	Hope-based reflexive response	Faith-based reflexive response	Comprehensive reflexive response

Source: own work.

One of the key requirements of contemporary science is that of rational process and outcomes. Still, pure rationality is hard to achieve for people, individually as well as collectively. I have already mentioned above some of the reasons for this. We attempt to satisfy this requirement using auxiliary principles and methods, such as: demand for measuring variables (quantifiability); use of mathematical models; heavy reliance on positive corroboration; triangulation; grounded research, etc. I support these criteria in all respects, as they are necessary for scientific discussion. Their normative attributes clash with human nature, and the results are well known to all. Transcendental reflection, i.e. based on CARNI beyond the senses and their extensions, mainly instruments,was not included in the header of tab. 9. Research which relies on CARNI from beyond the boundaries (of cognition,etc.), including non-empirical, cannot by definition fulfil science criteria, neither those of natural sciences, nor those of MSc. From the scientific point of view, it is required, obviously, that responding and research strategy comply with the standards of "rational reflection/complete reflection". Such a requirement is the ideal, which is difficult to achieve and sometimes purposefully ignored.

MSc, like all action systems, is subject to the success imperative. Yet, the concept of success in science, including MSc, as well as the pressure to succeed, are codependent on other elements of the science system (fig.1). A MSc system which has become dominant through competition is conducive to the doctrine and practice of freedom and independent research to a greater extent than a "sycophantic", normative MSc system.

The social setting of MSc that emerges from the interactions between the elements of the MSc system (fig.1) also results in some classic negative phenomena, such as:

1) infringements on free and independent scientific research, for instance due to the specific shape of science formalisation, or "pressures" from the authorities and administration,

2) producing "tailor-made" theorems according to predefined theses,

3) development of science marketing practices, or "science tendering procedures" of sorts

4) development of "scientific fads" (also related to ordered research),

[14] H. Witczak, *Elementy aksjologiczne kontekstu sukcesu strategicznego*, in: J. Rybicki, T. Dryl (ed.), joint publication, *Strategie sukcesu organizacji*, Prace i Materiały Wydziału Zarządzania Uniwersytetu Gdańskiego 4/3 2011, Wydział Zarządzania UG, Fundacja Rozwoju UG, Sopot 2011, p. 237

5) emergence of imitations and plagiarism, as well as scientific hoaxes.

A certain remedy may be sought in the development of CSR, including "best practices", also applicable to the governance of MSc, which have entered the canon of science process. They are based on ethics and morality in science, and transformed into standards applicable to the regular science management system.[15]

6.3. Scientific doctrine of MSc

Scientific doctrine is a very complex structure, reflecting the belief system about the whole scientific system (MSc system) and about the object of study – civilisation management system.

The doctrine includes, for instance, beliefs about science as a whole, such as the freedom and independence of scientific process and science system. Staying true to these beliefs and requirements may bring doctrine to the fore in building/shaping civilisation management systems. An example of the logical arrangement of MSc doctrine based on ontology and epistemology is presented in tab. 10.

Table 10. Ontology and epistemology in the MSc system

Status of MSc theorem object MSc system	**Ontological beliefs about managing civilisation systems**	**Epistemological beliefs about managing civilisation systems**
1. MSc aspirations	Content of values and goals applicable toCARNI (*cognitive, axiological...*) *management substance* of civilisation systems	Content of values and goals applicable to CARNI*management research substance* of civilisation systems
1.1. Operational aspirations		
1.2. Strategic and tactical aspirations		
1.3. Political aspirations		
2. Core of scientific activity	Processes, objects, institutions and social setting ofCARNI *management substance* of civilisation systems	Processes, objects, institutions and social setting of CARNI *management research substance* of civilisation systems
2.1. Scientific processes		
2.2. Scientific objects		
2.3. Scientific institutions		
2.4. Social setting of MSc		
3. Doctrine of MSc	Worldview on CARNI *management substance* of civilisation systems	Worldview on CARNI *management research substance* of civilisation systems
4. Situation of MSc (positioning of MSc towards independent variables)	CARNI of relations between *management specifics* of the object under study and its environment	CARNI of relations between *management research specifics* of the object under study and its environment
5. Constraints of MSc	CARNI of absolute constraints on the *management* of civilisation systems	CARNI of absolute constraints on the *management research* of civilisation systems

Source: own work.

The MSc doctrine may include the currently applicable paradigms of MSc, though proponents of pre-paradigm nature of MSc may claim otherwise. Scientific doctrines are not free from some highly questionable *a priori* assumptions. As an example we can take the so-called Smolensk investigation, which was conducted in Poland by competing groups of experts attempting to explain the plane crash of 10 April 2010 near Smolensk in Russia. Another apt example can be found in questioning the doctrines of economic liberalism and liberal management in the aftermath of the financial crisis which started in the USA in 2007. These examples prove that the doctrinal canon has the same properties as the object of MSc and the MSc itself (open, fuzzy, variable…).

Under these circumstances, it is an absolute prerequisite in MSc to unambiguously adopt and fully disclose the scientific doctrine prior to commencing a scientific inquiry. This calls for studies on practicable (possible, purposeful and viable) doctrines at the outset of the scientific process. Within the framework of academic discussion (external corroboration), it is also necessary for parties to agree a scientific doctrinal platform. Failure to do so is one of the key sources of unavoidable conflict and miscommunication and, ultimately, inability to reach an understanding in science. Doctrinal discussion and negotiations should be based on MSc metadoctrine, or otherwise it will be impossible to reach a consensus as the parties involved keep invoking new, ever-broader arguments. The case of Crimea in the Russia – Ukraine crisis of 2014

[15] Following discussion in the Polish academic community (starting in 1985, universities of Lublin and Krakow), on 28.10.1992 the Polish Academy of Sciences appointed a Science Ethics Committee, which published the "Rules of Good Scientific Practice" (Warsaw 1994).

shows quite well how various doctrinal claims may be made to justify this undertaking, including reaching to increasingly remote historic presences in Crimea, etc.

6.4. Positioning of MSc towards independent variables

Both the scholar and the managing party are involved in a game with internal and external circumstances governing the activity of civilisation systems/object of study. These variables are found within the sphere of the object of study and its environment (AS and its management system), as well as in the domain of MSc itself and its scientific environment.

Variables within the sphere of the object of study may be analysed using methods applicable to strategic management. Segmentation of research areas and variables in the internal potential must be based on specific assumptions. For instance, in the sphere of "development" the object of study may only be what we usually refer to as R&D, or investments, or even strategic marketing. Some believe that "development" should be perceived both as progress and regression.

Variables falling within the scope of MSc itself may be, for instance, differentiated in areas corresponding to MSc, as an AS (fig. 1). The above-mentioned games reveal themselves first as superior approaches and strategies. At lower levels, we can differentiate MSc management levels according to the categories of handled problems: 1) political problems and management; 2) strategic problems and management; 3) tactical problems and management; 4) operational problems and management. At the same level, we are dealing with problems and management dependent on AS stratification: 1) network problems and management; 2) corporate problems and management; 3) problems and management of responsibility centres (for-profit; non-profit; mixed); 4) problems and management of AS sub-areas, such as functions, processes, local factors (e.g. individual types of resources).

It is clearly visible that the situational context surrounding MSc has all the characteristics of an AS. The operational basic scientific inquiry is involved in a very complex situation. On the one hand, we may establish purely scientific criteria (extreme rationality, lack of bias, etc.), while on the other we depend on access to funding, peer review procedures, academic ambitions and, factors belonging to the academic community, such as beliefs, underperfomance of scientific instruments, etc. On the axis from exclusively pure science to the edge between science and non-science there is an infinite number of possible responses. MSc, which focuses on issues bordering on all sciences, finds itself in a difficult situation when it comes to respecting scientific criteria. Science requirements applicable to natural sciences may never be fully satisfied by MSc. Indeed, determining the science criteria adequate for MSc, which today are at an unsatisfactory level, is quite a *sine qua non* for MSc.

6.5. Absolute constraints of MSc

I view constraints of any object in terms of "boundaries". A boundary is a limit of sorts, a demarcation zone between a given object and its environment. The key to setting boundaries lies in adopting principles, including criteria, for the differentiation process and its outcomes. A boundary within this meaning may be reached, crossed or not, and for any potential cross-border "traffic" there are subsystems of entry and exit points. In some cases, the boundaries of a given object are easily reached and crossed, in others –it is only possible under certain conditions,[16] while sometimes they are unreachable and uncrossable. According to the doctrine adopted herein, in my view a boundary (an absolute/unbreachable constraint) refers to a situation where it is absolutely impossible to reach and/or cross a line, zone, area that separates a given object from the environment. Such an understanding of a boundary defines the freedom of organisational behaviours of a given action system, with regard to itself, as well as to its environment. In other words, an absolute constraint may not be, for any reason whatsoever, reached and/or overstepped, breached. All other constraints are reachable and/or crossable barriers, with certain odds of success, which are beyond the scope of this section. They are accounted for in other blocks of the diagram, in the course of risk analysis related to them.

Whether something may be an absolute constraint for the action system is not obvious, for a number of reasons. For instance, such constraints may be of subjective nature, more or less likely to emerge in the future, or may unexpectedly lose such status. MSc, like other sciences, is subject to dynamic, objective and subjective, predictable and unpredictable absolute constraints. The significance of the absolute constraints of MSc includes narrowing the sphere of competence of science and at the same time creating an exploration ground for pre-scientific and unscientific activity. It is not possible to determine the set of absolute constraints of science, nor is it possible to define future constraints. Below I point at some reasons for this state of affairs, assuming that they result from mutual, internal and external, interaction of two action systems: "the MSc system" (the entity conducting scientific activity) and other AS (the object of MSc activity).

[16]The crossability (breachability) of boundaries may be considered in terms of a continuum from 0 (absolute, unbreachable constraints) to 1 (lack of boundary or complete permeability). Herein, I discuss solely the zero (0) level of permeability.

1) *Constraints resulting from system aspirations*. Both the aspirations of MSc, and those of the studied AS, bear a strong, dynamically changing axiological mark. The basic absolute constraints here include: a) the difficulty, for the academic community as well as practitioners, of defining fundamental, axiological concept categories; b) autopoiesis, autonomy and constant give-and-take of values and interests; c) impaired measurability of studied variables. These constraints are not likely to lose their absolute status any time soon and are not easily transformed into controllable variables. Introducing complex methodologies of grounded research, studies of intervening variables (moderating, mediating, suppressor variables), network studies usually bring little and debatable progress.

2) *Constraints resulting from the nature of AS themselves*. They cannot be transformed into systems with antonymic properties, such as: a) closed; b) with clearly defined boundaries; c) fully quantifiable; d) homogeneous; e) durable and static, completely incapable of rise and decline; f) involved in mechanistic interactions internally and with the environment; g) fully predicable. The "absolute" boundaries of MSc are adequate here: open, fuzzy, etc. The theorems of MSc have the same properties, with only few that may be treated as universal laws or regularities. The hybrid nature of AS makes them the object of all sciences which contribute their achievements to the repository of human knowledge. As a consequence, the theorems originating in these sciences must be taken into account in MSc. I am thinking here of formal science, other liberal studies and social sciences, but most of all natural sciences. For instance:

a) Some laws of physics, chemistry, biology and their hybrids (e.g. sociobiology) may be universal laws, such as e.g. the laws of thermodynamics. Ignoring them in the management of AS may lead not only to failure, but also to tragedy. Some, such as e.g. the Pauli exclusion principle; Heisenberg's uncertainty principle; the Planck constant, impose immediate constraints on management and must be taken into consideration in MSc. They point out the consequences of the necessary autonomy of AS and the impossibility of formulating theorems with perfect accuracy.

b) Some laws formulated on the grounds of systems science and formal sciences (e.g. R.W. Ashby's law of requisite variety, K. Gödel's theorems, especially those on incompleteness). K. Gödel's theorem may be interpreted on the grounds of MSc in such a way that a given AS may not be explained fully based on the knowledge about it, exclusively with reference to itself. This highlights the significance of the environment in the management of AS, or makes it necessary to adopt doctrinal assumptions (originating outside the AS). In turn, R.W. Ashby's law means that no management system of AS may be perfectly efficient, because, by definition, its variety (element) is smaller than that of the AS (whole). R.W. Ashby's law is of fundamental importance in explaining and shaping not only the structure of the management system of AS, but also its effective interaction with other subsystems of the given AS. For instance, this law makes it possible to recognise, classify and explain, without the risk of major errors, the level of efficiency of the state, treated as a management subsystem of a given country.

c) Laws of economics and other social and liberal studies. These sciences formulate not so much laws, as regularities and principles, and this is the first problem. The reasons for this include the above-mentioned difficulties related to measuring variables and building precise research models. Psychology and sociology, for instance, formulate mainly qualitative theorems. History and anthropology have a problem with data certainty, as in many cases their data are reconstructed from circumstantial evidence.

A special role in constraining management falls to economics (ESc – economic science). The law of economic surplus (to survive, every AS must generate economic surplus) forces MSc to study the approach of any AS to the surplus, in terms of the impact on the system structure, functioning and behaviours. The management system of any AS may not be shaped without reference to this law or by proposing managerial solutions contrary to it. Such propositions unavoidably lead to impaired performance of such an AS and, ultimately, its collapse.

Conclusion

This effort is by far incomplete and calls for significant elaboration and development. Nevertheless, I believe that it may serve as a starting point for reflection on the identity and structure of the MSc system. People shape (create, maintain, eradicate and change) action systems and civilisation systems. Scientific theorems about them which we ascribe to the field of MSc must also take into account that the sciences themselves are a category of action and civilisation systems. As a consequence, the science attributes of MSc should be perceived in a unique way, in light of the prevailing science model, i.e. natural sciences.

Apart from the above-mentioned factors shaping the identity of MSc, I also address other, natural constraints, resulting from the specifics of action and civilisation systems. These include, for instance, the attributes of human condition, i.e. autonomous systemicity; intuition, emotions, rationality and their composition; decreasing capability of cooperation (incompatible interests; costs; centrifugal forces; conflicts; negative synergies) that accompany increasing integration of action systems. There is a natural inability of MSc to cope with turbulence, breakthroughs and astonishment, lack of transparency or predictability. The response of MSc often resembles the pursuit curve – which is a result of its suboptimal ability to proactively act ahead of the original action and civilisation systems. MSc takes advantage of the opportunities for

shaping master models of action systems, and implementing them, depending on the adopted assumptions and the capability of implementing them (doctrines; authority). Such examples of management as the Khmer community, China during the Great Leap Forward, Nazism; etc., are sufficient illustrations of this thesis. Other, equally important factors include: 1) the dominant and decisive role of axiology and interests in shaping civilisation systems and MSc; 2) interdependence of variables in the civilisation management system, which causes fluidity and oscillation/diverging from the equilibrium of those systems (having the same individual properties as the object under management).

Development of science is cumulative, but in MSc it is more prone to change than in natural sciences. That is why the discussion on the singular and distinctive characteristics of MSc – and ultimately its scientific value – is by all means necessary.

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