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Organization and Decisions in Process Management in the Aspect of Diversity Ontology: Science Methodology Approach

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Abstract:

Purpose: *The main purpose of the article is to highlight the role and impact on modern management of natural processes of knowledge about their nature expressed through their diversity implied by the ontology of Nature. Demonstrating the validity of using ontology in management to explain the basics of management in relation to its functions. This management derives the knowledge of fundamental science, which is based on the study of the ontology of Nature.*

Design/Methodology/Approach: *The authors accepted the thesis that complex processes which contemporary management encounters should be solved with the use of complex formal tools. Thus, both approaches must be related by a specific cognitive resonance (application of adequate theory methods to a given form of system diversity). The paper consists of ten points, preceded by an introduction. It demonstrates the structures of diversity based on fundamental scientific works related to the issue of diversity of reality. The objective goal of the article was achieved by referring to the concept of coherence – coherent participation, even of concepts different in terms of quality, related to the studied process in which these concepts (factors) function.*

Practical Implications: *Thanks to the new and formal paradigms of modern science we are able to penetrate deeper into the nature of the real processes (economic, social, and even into the nature of our mind) - which was studied) and their complexity (structure). It can be said that every structure (especially a process) is its ontology. If I know the structure, I can manage it practically. Knowledge is acquired by examining the structure of processes, their dimensions (the degree of complexity), behavior, and then through the process of explaining why this and other objects (processes) behave this way and not otherwise. Ideally, it would be possible to put all this together and explain why a given process behaves differently from another and at the same time answer the question of its nature – complexity,*

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i.e., the structure of reality. The authors have tried to indicate in the text to what extent is possible to solve the above problems.

Originality/value: *The originality of the content of the article lies in the combination of theoretical concepts related to the research on the nature of some reality processes with transferring knowledge about objects and processes to a practical dimension, i.e. applying the acquired knowledge in Management Theory and Organization Theory. The authors tray to present how a new approach to the analysis of the systems theory of organization and management is possible from the perspective of knowledge about the diversity of reality presented in the paper.*

Keywords: *Diversity, information, constraints, dimension of space, scientific language, decisions, organization, (strategic) management.*

JEL codes: *L22, M11, O32, C80.*

Paper type: *Research article.*

1. Introduction

When taking any decisions in everyday life, both those very important in life and those of little importance, it may turn out that in the dimension of their information value (indefiniteness) they are equivalent – similar, analogous, and in the quantitative sense equal. The aim of the article is to indicate where all this comes from, i.e., obtaining knowledge about the studied processes from paradigms, scientific theories and other forms of obtaining information.

And it will consist in explaining these sometimes apparent paradoxes of the content of objects operationally through the language of modern science methodology. And unfortunately, in the discourse there will once again be a need to refer to the division of the studied process (object) into its form and content. This division was made by Aristotle and carries its cognitive consequences to this day.

However, the novelty of the presented analysis is the implementation of the goal, i.e. explaining and finding the common part of this division – what the form brings to the content, and the content to the form from the point of view of human consciousness and perception. It is particularly difficult to see this division in the case of objects of nature, i.e. division of an object into form and content[4]and it is through information.

Because an object or a process is a whole and this analysis will be made from the position of today's knowledge about the studied objects in relation to form and

[4]*Considering a tree as an object –a human brain does not divide the tree into form and content, we see it in its entirety. But science does it. Its task is to show the internal diversity of the object (actually any – real and abstract one).*

content. In addition, for a more thorough analysis of the presented problem, it is necessary to apply the concept of diversity, similarity of structures and analysis of the amount of information contained in the structures represented by objects and processes, i.e., some formal or content measure of it.

A complicated issue is to be told in the article in a simple way. And all this, in turn, is to serve to make rational decisions in broadly understood management. Moreover, and above all, it is to translate into a better understanding of the nature of objects and processes and their behaviour, i.e., getting to know them.

Therefore, in order to be able to manage anything well, one must first understand the managed object. Understanding based on what? By learning about its behaviour and structure (organization) and functioning (behaviour).

The assumed objective can be achieved by using various research means: paradigms, models, methods and tools. Systems analysis, widely used in science, is a classic paradigm that brings together models, methods and tools.[5] In the last decades of the development of science, a new paradigm called the dynamic complexity theory emerged, i.e. one that analyses the structure (nature) and behaviour of processes, and above all their complexity in time.[6]

In explaining the problem, certain notions important in the ontological sense also help, and perhaps especially. They are important for learning and presenting the structure of the studied objects (through their properties), captured (expressed) in the form of concepts of a very general nature, but at the same time of fundamental meaning.

For example, such as, diversity, diversity constraint, structure, number of degrees of freedom, invariants, randomness, amount of information, state of the system and others. These concepts related to the dimension of diversity, logic and knowledge create the dimension of rational management of the examined processes and decisions related to these objects together with learning about their organization and structure from the perspective of our behaviours recognized in psychology (Nosal, 1993).

The presented discourse will be devoted to the above-mentioned concepts and their role in making important decisions, both for management and in the area of science

[5]*With regard to many studied objects and processes, modern science provides the answer to these questions. This is addressed, among many other scientific studies, in General Systems Theory (von Bertalanfy 1968). The role of this theory was analysed in which the system analysis was seen in a slightly different aspect in content and form than in the current text(Galanc,Kołwzan, Pieronek 2014). It was objectively emphasized that criticism of this approach to science by Bertalanfy is also expressed in science.*

[6]*The theory of complexity will be given a place in further considerations on the problem of diversity.*

(knowledge) in general, but also decisions related to the dynamics of objects' behaviour and their organization.

2. Ontological Categories of the Diversity of Nature

In this part of the text, the ontological foundations of the category diversity appearing in science will be discussed. The ontology of the object and, more broadly, of the process is their nature (the complexity of the structure). But for the most part, it will be an analysis of the hard structures of the conceptual category in the scientific dimension, appearing under the name of diversity.

It will concern the discussion of physical and, at most, biological processes. It will not cover (apart from examples) processes of diversity related to the humanities (social, thought processes and processes of speech and language).[7]But sometimes these hard structures are subjected to philosophical analysis.

2.1 Basics of Diversity Theory

It is commonly said that the reality that surrounds us, or rather its part, as Nature (objects and processes occurring in R^3, but on Earth) is particularly diverse. It is customary to call this property the diversity of the world. Below, an attempt is made to discuss how all this presents itself in some dimensions regarding the foundation of diversity.

3. The Concept of Diversity

William Ross Ashby, a promoter of formalized cybernetics created by Norbert Wiener, in his book entitled *Introduction to Cybernetics*, attached great importance to the role of the concept of diversity in scientific analysis, specifically in relation to research related to the behaviour of objects and processes and to express their *structure(organization)* in relation to many fields of science (through verbal or operational examples constructed by him or others). As a result, his investigations were also related to the determination of the stability (balance) of the behaviour of the process (object) using this concept (Ashby 1963).[8]

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[7]*The substantive analysis of this dimension of diversity is covered by the discourse in the second part of the paper.*

[8]*In analysing the problem, he used the scientific achievements of A.A. Markov (Markov 1906), C.E. Shannon (Shannon 1949), the foundations of cybernetics by N. Wiener (Wiener 1950), the methodology of game theory by John von Neumann (von Neumann 1928, 1944, 1947, 1961) and the results of other scientists, such as the scientific results of the Russian scientist I.P. Pavlov (Pavlov 1927), who studied conditioned reflexes. These outstanding achievements of Pavlov, in turn, allowed Ashby to frame the learning process as a limitation of diversity (analysed by psychology) Pavlov, for instance, in one experiment gave both thermal and tactilestimuli, as well as reinforcement by meatpowder, in the following combinations:*

Diversity as a scientific and colloquial term at the same time, in science and in everyday life, has been known for a long time. It was used even before the appearance of the above-mentioned Ashby's scientific work and other scientific works analysing this important concept of science. The term is well known in physics, general biology and nature, psychology and sociology.[9] The science of management itself also highly values this scientific category (Gross-Gołacka 2018; Thomas, 2004).

Diversity is a global, ontological object. It is so important scientifically and practically because it refers to the features of nature that are its foundation (the above-mentioned ontology that creates its diversity). Therefore, the above-mentioned scholar gave the term a special content dimension and formal scientific meaning.

Ashby consciously noticed and attempted to formulate mathematical measures of the concept of diversity, but in relation to its most general meaning, understanding it, abstracting from the field of knowledge with which we are dealing, i.e. he formulated this concept cybernetically. So, what is diversity and how should it be understood in this scientifically new view formulated by Ashby?

Diversity is associated with a specific object or, more generally, with a process. Nature (immersed in R^3) also has diversity, because it consists of various objects and processes (but in a huge number of them, and even in quantity – subsets of a continuous set). Each object and process consists of elements and has its own structure – complexity. Therefore, a set can be taken as the basis for recognizing (understanding, defining) diversity. But this concept has no definition from a

	Thermal	*Tactile*	Reinforcement
1	+	+	+
2	+	–	–
3	–	+	+
4	–	–	–

(The fourth combination occurred, of course, in the intervals.) Now the total combinations possible are eight. Pavlov presented only four. It was an essential part of the experiment that the full set should not be given, for otherwise would be nothing particular for the animal to learn(Ashby 1963, pp. 190-191; Pavlov 1927).

[9]*The issue of diversity, especially in relation to biology, was dealt with by N. Rashevsky. He formulated, among many other laws important for biology, the concept of biological epimorphism. This is an important discovery in the form of the law of biology, which states that the more biologically organized a system is (it has a higher complexity in relation to less organized systems), then it also creates (its nature) systems (organs) that take on detailed processes associated with the forms of behaviour of a given organism (Rashevsky 1954, 1962, 1965). N. Rashevsky's collaborator R. Rosen (Rosen 1958) and A.I. Oparin (Oparin1957). In terms of psychology, J. Piaget (Piaget 1981), and even in relation to political ideologies, had a scientifically significant voice on this subject(Volgin1970). Many scientific works on this term, concept and word can be cited. The indicated publications are the most representative and source scientific items.*

mathematical point of view. Paradoxically, it is difficult to define this concept (supposedly simple in understanding). A set in mathematics is understood as the so-called primary concept, i.e. it is not defined.

In other words, what is primary is at the same time obvious in understanding, that is, its understanding is clear. Similar thinking applies to understanding the notion of an axiom.[10]

According to William R. Ashby's reasoning regarding diversity, we ask, for example, how many distinguishable elements the following set consists of:

$$X = \{c, b, c, a, c, c, a, b, c, b, b, a\}.$$

Since we, as humans, can distinguish the elements of a set, we should say that the set X contains only three different elements. They are: a, b, c. Then we say that the set has diversity equal to three elements.[11]

At this point, it should be added that the diversity of a set is not only its internal property. In order to correctly define the diversity of anything, it is sometimes necessary to indicate the observer and his ability to distinguish, i.e. the ability to classify elements (objects) of a set (Ashby, 1963, p. 178). It can therefore be said that diversity is a set of distinguishable and structured elements – components.[12]

4. Diversity of Nature

In order to be able to distinguish (differentiate) the processes and objects of Nature, one must have the skill (ability) and tools to identify them.[13] The problem relates to

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[10]*There are numerous examples of formal (axiomatic) systems, in which the axioms and even primitive concepts are objects that are very complex in terms of formal structure. The shortest known such axiom (implication-negation) is Meredith's expression in relation to propositional calculus of the form:*

$$\{[((p \to q) \to (\sim r \to \sim q)) \to r] \to t\} \to [(t \to p) \to (s \to p)],$$ *(Borkowski 1977, p. 89).*

[11]*But someone can count them and say that there are as many as twelve (12). This means that the distinguishability of elements in a set may not be clearly seen and understood (even in their original meaning). Because, in addition to primary concepts, there are also secondarily created concepts that appear next to them, arising from them and gave rise to the consequences of their original content. Moreover, some elements of the set may be different for some, and the same for others (e.g. green and red colours are the same for colour blind people).*

[12]*And this understanding of the concept of diversity is also a dimension of Ashby's greatness as a scholar.*

[13]*Man, having his senses assigned to him, does it spontaneously. But there are things and processes whose nature is different from this sense perception. After all, man has reason and has the ability to think. And through the achievements of this thinking in the form of science, it is shown, abstractly and empirically proved, that it is often different than what human*

the classification of objects and processes in general. Therefore, next to the senses, this determinant is the human mind, which is able to distinguish (through science – cognition) various forms of nature, i.e., its diversity (ontology of objects and processes).

The logic of thinking and formal logic created by man naturally enters the area of object classification. And this is where they meet through logic, cognition, and ontology. So we ask logically, how many categories of diversity are there? This is a question about the categories of the ontology of nature. Aristotle (Aristotle, 2003) identified ten of them, and then reduced this number to seven (Jodłowski, 1971).

The other side of the problem are scientific methods (of the human mind), methods of learning these categories of nature. In terms of cybernetics, it is a kind of feedback – a game between man and nature. The need to classify objects of Nature has been seen by humanity for a long time and has been implemented practically.[14]

Science consists in such activities that are applied all over the world (through publications) in a uniform, i.e. scientific way (in practice it varies). After all, it is Science that is a great civilizational achievement within the framework of all mankind.

And that is why Diversity (in general terms) should be analysed, researched, synthesized through the Observer, which is, among others, Science understood as knowledge.[15]

According to this reasoning, attention will now be focused, as it were, on the interior of the knowledge of diversity, obtaining more detailed knowledge about it. Expressing itself in the language of the German philosopher Edmund Husserl, it is symbolically about eidetic penetration into the studied process through its pure phenomenology (Husserl, 2012).

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senses indicate. And in the colloquial edition, it is said after some time that two people saw the same things differently.

[14]They were different in different societies and civilizations. And they still differ in form and content. This is especially true of value systems. These value systems are often the cause of religious, political, economic and other wars.

[15]The scientist who developed the first scientific procedure for the taxonomic classification of objects by studying the ontology of processes (from the point of view of anthropology) was Jan Czekanowski (Czekanowski1913). What is knowledge? We do not have a clear definition of it, but what it is we understand (feel) mentally. Either way, it's a process of knowing. And that is why it is through cognition, i.e. the acquired knowledge, that we gain understanding of the behaviour of one or another, that is, of a different variety of the process. The following paragraph captures the above thought in the dimension of acquiring knowledge through concepts, new elements of the structure of the examined objects (processes).

5. Nature and its Limits

We already know that the basic determinant of recognizing and expressing diversity is the set. But diversity is also inextricably linked to another important scientific concept, which is the limitation of diversity. Reducing diversity can be considered in the content and formal (operational) dimensions. It should be noted that, in fact, it is the category of the concept of limitation of diversity that determines the degree (dimension) of complexity, i.e. the diversity of nature, and in fact the diversity of its processes and objects.

A diversity constraint is a relation between two sets that occurs when the diversity existing under one condition is less than the diversity existing under another condition.[16] Thus, the diversity constraint can be weak or very strong. This is manifested, for example, in relation to the ordering (distribution) of objects according to certain established criteria adopted by the observer. Attention, who or what is the observer and what he brings to the area of cognition of the surrounding reality, has been paid earlier.

An important example of such an observer will now be presented. It can be a scientist, more generally – science – as a typical example of an observer of seeing reality. Some theories for one and the same object have changed in the history of science, so the observer's opinion on the way of perceiving and expressing a given object of reality has changed, and this through the language of science, and especially through its concepts (terms).

A change in looking at a given object (its understanding) is a change in the position (place) of the observer in seeing and understanding the surrounding reality. This symbolic place of the observer is in fact generally realized through specific tools of cognition and research methodology, new paradigms and theories formulated (Kołwzan 1983; 1992).

They can be inflicted somehow by the nature of the ability to perceive reality (senses). As a scientist, he can also use the language and cognitive tools created by science and technology, which allow him to see reality one way and another (ordered), that is, to see its diversity through its limitations, at a given moment of cognition, at a given moment of the state of science (conscious limitation of learning about real and abstract reality through the lack or access to precise scientific tools).[17]

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[16]*The human gender limit is 1 bit, but in an all-girl school it is only zero (Ashby 1963, p. 181).*

[17]*Albert Einstein, after creating the foundations of quantum mechanics, was asked why he used the mathematical statistics tool to describe it. He replied that for the time of scientific development, these tools most adequately represent the nature of quantum mechanics.*

At this point, the problem could be summed up by asking the question: actually, who gets to know whom? The observer studies the objective reality, or, to some extent, reality is presented through the language of science (by this observer), which to some extent depends on its nature (it seems to provide him with research methods for exploring it - through the senses).

But on the other hand, it all depends on the philosophy of cognition (interpretation of information about the environment). In the end, knowing comes down to the fact that nature is not obligated to the observer to reveal all that it is.[18] She is always herself and always has an advantage over the Watcher after all. The history of thousands of years of nature's behaviour is proof of this generated conclusion.

And sometimes it is people who, allegedly studying nature, disturb nature (some of its processes) through human activities, thanks to the cognitive tools provided by this nature, which will be discussed in more detail during the analysis of social processes.

6. Diversity as an Ontological Feature of Nature (the Ontology of Nature Expressed through its Diversity)

In this part of the discourse, the problem discussed above, related to diversity in terms of its constraints, will be presented on simple examples. Diversity constraints are a basic property of the world that surrounds people. This is its Ontology. Since there is a world, it must have a structure that something has determined and shaped.

Ontology sets constraints imposed on objects and processes present around people, which is expressed through the laws of nature, ordered sets and similar structures that contain a certain finite number of its various elements as components of an object or process.

However, in relation to specific objects created from them, only some of their possible combinations are realized. And in a way, this is a good working definition of the term: diversity constraint. But Nature manifests its limitations through various available means and dimensions (representations), which science tries to know (decode, so to speak).

And it is the next chapter that will be devoted to the means of decoding the information contained in the objects and processes of Nature.

[18] *At one time, the concept of continental drift was not recognized by most of the scientific world, and by some it was even ridiculed. On the other hand, also in science, the concept of caloric and phlogiston was accepted as a scientific example. Years later, the scientific concept of Alfred Wegener (Wegener 1912) proved to be real.*

7. Vectors as a Constraint of Diversity

Sometimes it is the case that the elements of a finite set forming a certain complexity (diversity) are ordered and as a whole form a vector. In fact, we can say that every somehow organized object of nature is ordered. Here it is about a different approach to order (an approach through dimension, through elements that are independent of each other). A vector as a mathematical concept is a set of ordered elements.

The elements of a vector are called its components, and it is W.R. Ashby attached great importance to this concept in the analysis of the category of diversity (Ashby, 1963).

There are three types of traffic lights at the intersection of streets. The order in which they appear as components of a dimension three vector imposes a constraint on all possible combinations. This constraint sets an unambiguous order for the movement of cars through intersections.

Limitation of diversity occurs in such cases, especially when the real number of vectors is smaller than the total number of possible vectors (in the absence of any conditions – constraints), i.e. when each of the components can assume all values regardless of the values assumed by the other components.

In addition, we emphasize that although the dimensions of space are independent, as noted above, they can create various relationships with each other (an example of this are the objects mentioned above). But here it is about the behaviour of the objects (as it were, their nature) within their particular spaces, about their type of changeability – diversity in relation to the relationship that connects them.[19]

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[19] *We want to express the probability density of a random variable $Y = X^3$ expressing the volume of a cube, or dimension three, if the edge of the cube X (of dimension one) is a random variable with probability density:*

$$f(x)=\begin{cases} 0 & dla \quad x<0, \\ 1/a & dla \quad 0\le x\le a, \\ 0 & dla \quad x>a. \end{cases}$$

The behaviour of variable Y, despite the fact that it represents a dimension larger than the dimension of the X edge of the cube, is nevertheless a variable dependent on the behaviour (variability) of the X edge. Various relationships are possible in mathematics. Paradoxically, object Y is subject to its part X. This part dictates the behaviour of the whole object. After all, it is also not completely true, because the behaviour is determined by the nature (type) of the distribution (i.e. function). And with respect to the edge X, its behaviour (variability) has a rectangular (uniform) distribution over the segment [0, a], while the density of the probability distribution of the random variable Y has a different type of distribution (character, i.e. diversity), because it is presented in the form:

8. Degrees of Freedom as a Dimension and Feature of Diversity

At the outset, a question should be asked, what does the concept of the number of degrees of freedom mean from the point of view of science?[20]The meaning of the term number of degrees of freedom, what it is used for and how it is determined will be explained on the basis of mathematical statistics, because this is where the concept is used scientifically.

The essential essence of the number of degrees of freedom manifests itself in scientific research of a statistical nature, and then only in the content dimension, i.e. the interpretation of the obtained statistical results, and only when we know what the number of degrees of freedom in statistics means, can this concept be transferred to other fields of knowledge to they should be interpreted sensibly in these fields and preferably in terms of content, i.e., to understand their meaning for those areas which they represent in terms of content.

Simply put, you must first be able to answer the simple question of how many independent objects contributed to the obtained result (tested object or process), and only then answer other questions related to the interpretation of the obtained statistical dependencies. Thus, the number of degrees of freedom, being one of the important foundations of scientific research, is an important dimension of the 'scientificity' of the results related to the reduction of diversity.

9. Number of Degrees of Freedom in Scientific Research

The concept of the number of degrees of freedom plays an important role in mathematical statistics and the procedure for determining the number of degrees of freedom from the operational (formal) side looks different than in the examples presented in the footnotes. Although here the basis for determining the number of degrees of freedom is also the number of independent objects involved in the

$$g(y)=\begin{cases} 0 & dla \quad y \le 0, \\ \dfrac{1}{3ay^{2/3}} & dla \quad 0 < y \le a^3, \\ 0 & dla \quad y > a^3. \end{cases}$$

How to get this density of probability distribution follows from the theory of probability calculus. Accounting operations are simple. The presented example related to the functions of continuous random variables.

[20]Pointing the simple examples of the number of freedom degrees taken from the so-called everyday life: having four legs and a top, you can create a table from this set. This arrangement has 2 times 4! degrees of freedom, so there are 48 possible variants of the table. Given is a cardboard cube. Placing it on a table on one of its walls will give you a 3! degrees of freedom (because a cube has three dimensions), six positions – each wall is painted in a different colour.

statistical problem under study (where the number of degrees of freedom is a *sine qua non* condition for statistical calculations).

But all this is reduced to a clear mathematical form (formula –procedure)[21], where the basic role is played by the size of the statistical sample taken from a certain population *X* in an independent manner.[22]A theory has even been developed in statistics related to statistical sampling. This branch of statistics is called the representative theory (Pawłowski, 1972, pp. 17-19; Greń, 1984, pp. 237-285).

Monte Carlo random numbers are also used in sampling (Freund, 1967). However, the number of degrees of freedom is closely related to the dimension of space, which is represented by a simple statistical sample with *n* elements. And this sample, in turn, being a dimension, is ordered in the order of *X* elements taken from a given population.

And this ordering is expressed mathematically by an *n*-dimensional vector$[X_1, X_2, \ldots, X_n]$. Moreover, if the sample is large enough (n≥100, and sometimes even n≥30 is enough), then the basic statistic determined from this sample $\overline{X}$, which is the sample mean, has a normal distribution with the parameters m (expected value) σ/$\sqrt{n}$and (standard deviation), i.e. $N\left(m, \frac{\sigma}{\sqrt{n}}\right)$, regardless of the distribution from which the simple statistical sample was taken.[23] Why are we talking about this here. Well, in

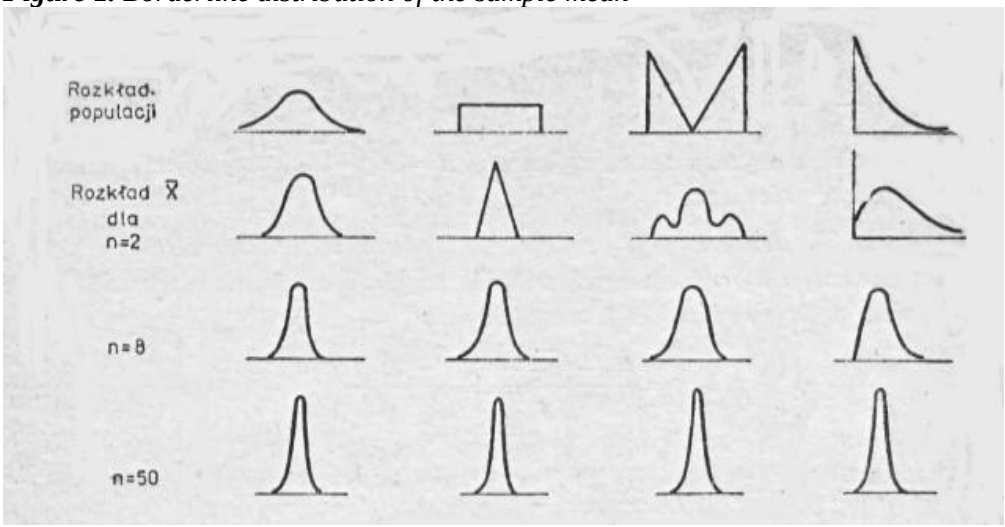
[21]*The degree of freedom is an independent element in the analysed object, which may be of a more or less complex nature, and then the method of calculating the number of degrees of freedom depends on the methods available to science to demonstrate this complexity, i.e. specify how many independent components it has and measure.*

[22]*In specific statistical applications, it is associated with statistical tests (distributions) such as: distribution* χ^2 *, Student's t-statistic and others, in which this number is fundamentally different, smaller than the observations (objects) taken for statistical analysis. Thus, the number of degrees of freedom determines the number of independent objects (observations) involved in the analysed decision-making process. The statistical details of determining the number of degrees of freedom involve specific problems of their use and we will not discuss them here. Everything is contained explicitly in mathematical statistics textbooks. The world literature knows many of them, and they are excellently written in terms of didactics for scholars and students (Freund 1967; Cramer 1946;Greń 1978, 1984;Pawłowski 1972;Wilks 1963 and many others).*

[23]*This truth is demonstrated by the calculus of probability through the Lindeberg-Lévy theorem, which says that for any population with a finite mean m and variance*σ^2*, the arithmetic mean* $\overline{X}$ *, of a simple sample drawn from this population* $n \to \infty$ *has an asymptotic normal distribution* $N\left(m, \sigma/\sqrt{n}\right)$*. This is illustrated in Fig. 1, where u at the top, the population distribution is sketched, and at the bottom (level 4) the borderline normal distribution of the mean* $\overline{X}$ *from a sample drawn from this population (Greń 1978, pp. 147-148).*

order to emphasize (emphasize) that diversity is able (has such a feature) to combine its various dimensions (faces), i.e. it creates other diversity itself (illustration by the given example). This shows, among other things, the dynamic theory of the complexity of the world around us. And its theory in the form of science is developing very intensively, especially in recent decades (Peters, 1997, p.183 and others).

Figure 1. *Borderline distribution of the sample mean*



Source: *Greń 1978, pp. 147-148.*

10. Summary and Conclusions

The article was devoted to considerations related to the structure of the Ontology of Nature, resulting from its complexity and its knowledge of cognitive conclusions and the possibility of using this knowledge in management practice.

Attention has been focused on the processes and objects occurring in the life of man, to which he is subordinated. After all, it was Nature that created man so that he could exist in it. How to exist and how much to exist has been highlighted in a way in the second part of the text on diversity.

The article concerned only a few of the numerous areas related to the issue of the diversity of the surrounding reality, i.e. the world in which we humans live. It is through the prism of our understanding of it that we make decisions and, as a result of these decisions, we manage what surrounds us.

Within our human competence to understand Nature, we try to do it rationally. And we gain all understanding through the senses and knowledge – the language of science. However, the foundation of the language of science is natural language and thinking (speech and thought). Language and thinking shape human consciousness

and, consequently, mentality. These conceptual categories are the basis for creating the language of science.

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